Vol. 10, No. 2

FEBRUARY, 1955

AGRICULTURAL CHEMICALS

In This Issue:

Agricultural Chemicals in Mexico

NYS Experiment Station

Grace Ammonia Plant

N. C. Pesticide School

Northeastern Weed Conference

Growth Regulators

Grain Fumigation

Pacific NW Insect Control Conf.

Pink Bollworm Menace

NOW...FOR THE FIRST TIME!

The new antibiotic formulation for plant diseases

Controls terminal twig and blossom blight • Safe to plants. Does not injure trees, reduce set or impair fruit finish • Easy and economical to use. One quart and half pint bottles enable grower to use entire contents per each mixing operation. Bottles also graduated for low volume mixing • Also available in 50 gallon drums for repackaging • Makes true solution . . . not a suspension . . . and there is no settling out • Contains 20% streptomycin in aqueous solution • Also controls bacterial leaf spot of tomatoes and peppers.

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PHYTOMYCIN*
(say Fy-toe-my-cin)
is manufactured by
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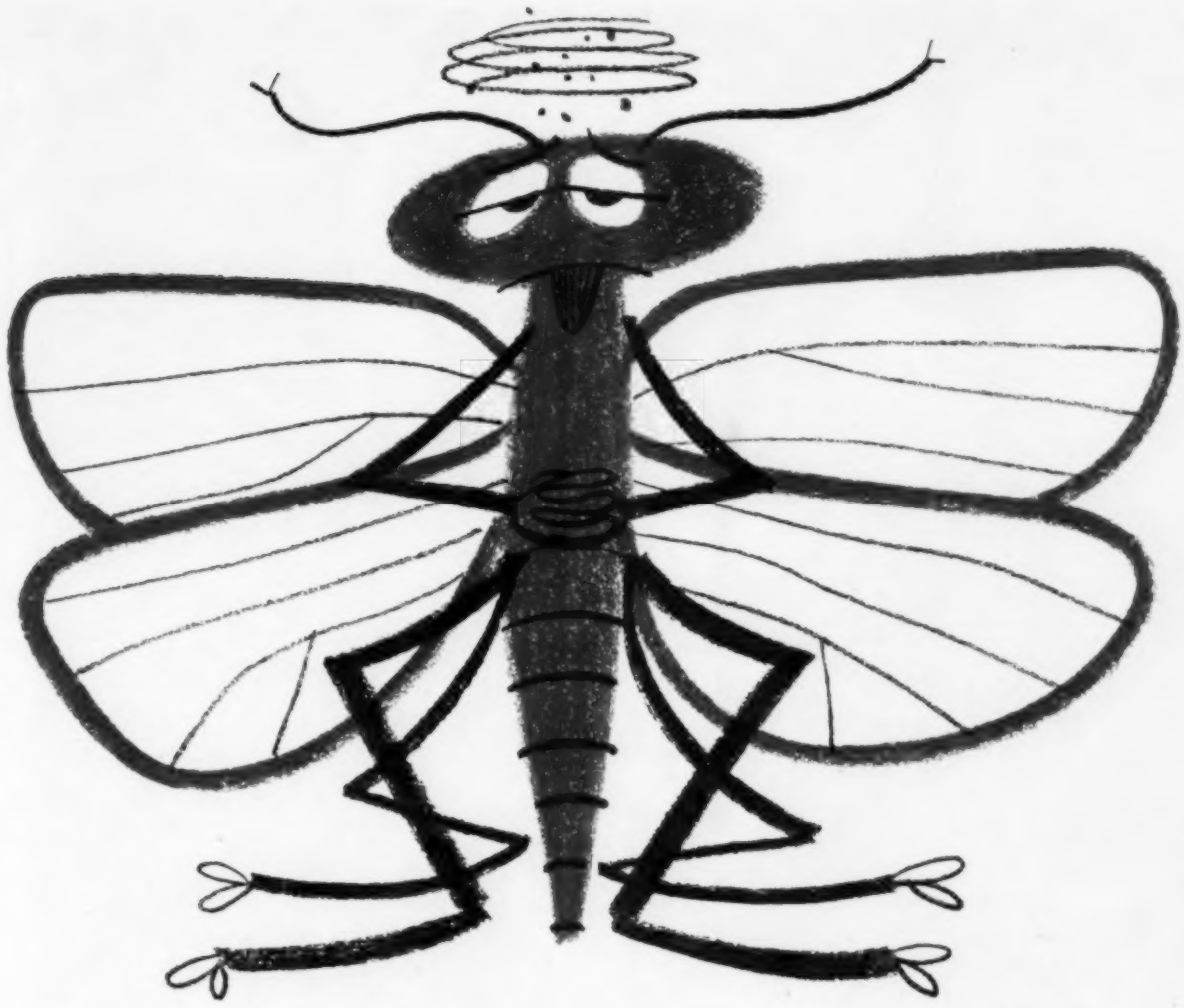

It's not the pest but the processor who praises Attaclay®

Just Off Press . . .

. . . the current issue of Attaclay Pesticide Digest, discussing various aspects of pesticide processing. Write for your copy, and future Digests as published.

This unhealthy codling moth "read" the opposite meaning into Attaclay's *conditioning ability*. So he's getting unhappy results. But to primary-base manufacturers, blenders, and growers, Attaclay's dust conditioning ability means money in the bank.

Attaclay-formulated dust bases and wettable powders have "built-in" conditioning. Dry, loose and free-flowing when produced, they stay that way until used.

Blenders are apt to look at healthier bank balances, too, when they use Attaclay. Used as straight diluent, it pyramids quality into *his* products. Or—in conditioner percentages—upgrades any field strength dust and makes it freer flowing. Or adjusts bulk so that containers are standardized.

One look at the moth almost tells the grower's story . . . how Attaclay-based powders disperse and suspend so effectively in spray tanks . . . how the dusts flow, disperse, settle, cover, stick and kill.

Conditioning—from formulation to kill—is just one of Attaclay's proven abilities. May we get together on a whole new value for your products?

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MINERALS & CHEMICALS CORPORATION OF AMERICA

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Giant Servant of Agriculture

It is called potash because in primitive times it *was* ash, from burned wood. But when man found potash among nature's own mineral deposits, it grew to gianthood as this nation grew.

This giant servant has helped to make America great, with bountiful harvests.

In its way, Potash Company of America is a giant servant, too. Our help to productive agriculture, through better fertilizers, has meant a share in America's growth — and we are proud of that share.

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RED MURIATE

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A Monthly Magazine For the Trade

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This Month's Cover

Dusting beans in experiments designed to study the control of leafhoppers, Empoasca spp., at the experiment station of Comision Nacional del Maiz at Jaloxtoc, Morelos, Mexico. (See story page 26-28).

FEBRUARY 1955
Vol. 10 No. 2

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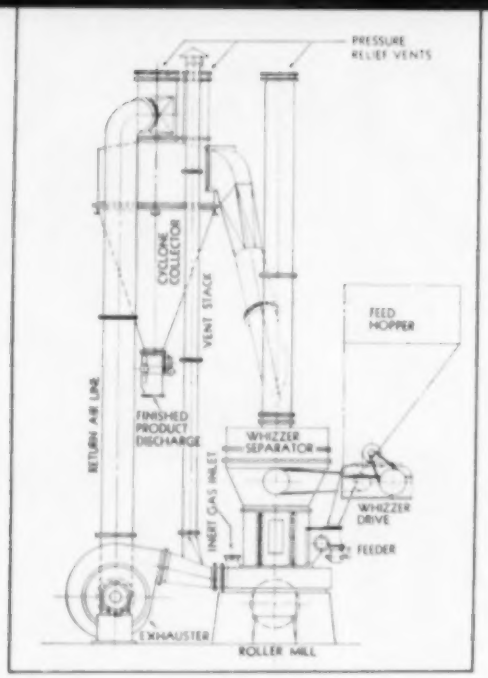
Entered as second-class matter November 4, 1949, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

RAYMOND HIGH SIDE ROLLER MILL

Specially equipped for SULPHUR GRINDING



Flow sheet of a sulphur grinding operation with a Raymond Roller Mill, showing pressure relief vents and inert gas inlet.

THE design and construction of the Raymond Roller Mill make it a highly efficient unit for pulverizing sulphur and sulphur-bearing insecticides.

The slow speed of the Mill and the large air passages through the Whizzer Separator help to prevent the sulphur from overheating or sticking. Special ball bearing journals, designed for sulphur grinding, are used and the entire system is blanketed with inert CO_2 gas.

Electrically welded, heavy-gauge piping, pressure relief vents, and double discharge valve at bottom of the cyclone collector, assure a gas-tight system and provide a safe, clean, automatic, dustless operation.

Raymond Roller Mills with their ease of control, economy of production and uniformity of finished material, are equally efficient for handling various insecticide formulations and also phosphate rock fertilizer.

RAYMOND ROLLER MILL showing cut-away view of Whizzer Separator. Wide range fineness control provided by one simple adjustment while mill is running.

Write for Raymond Bulletin No. 68 of Insecticide & Sulphur Grinding Mills

COMBUSTION ENGINEERING, INC.

Raymond Division

1314 NORTH BRANCH ST.,
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your eye tells you why

International's New Triple Superphosphate Means

better granulation

YOUR first glance tells you why the fine, virtually dust-free texture of International's new Triple Superphosphate gives such improved results. It promotes better granulation in your high analysis plant foods — improves product acceptance. It assures thorough and more complete ammoniation; reduces the need to grind before mixing; cuts mixing costs. Proper conditioning before shipment also reduces the problem of setting up en route, for easier, more economical handling — plus high product performance.

International's new Triple Super offers these extra benefits because it's produced by a new process from high quality rock. Result: a high analysis product (46% A.P.A. or better) with the right particle size and correct chemicals structure for best results in making modern plant foods. International's expanded facilities assure a reliable supply of this improved Triple Superphosphate, now available for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.

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SINOX
SINOX GENERAL
SINOX PE
SINOX W

DINITRO WEED KILLERS

that signal, in all directions, fair weather for SALES!

SINOX — the original dinitro weed-killer — has gained widespread customer acceptance during the last seventeen years. In 4 special formulations, the SINOX label always means *additional* sales in *all* types of weed control. Stock up, *now!* Send for prices, marketing agreement, and other information.

SINOX uses

weed control:		
selective	SINOX	For safe selective weed control in onions, flax, and grain.
	SINOX W	For selective spraying of seedling alfalfa, onions, flax, and grain seeded to legumes.
pre-emergence	SINOX PE	For pre-emergence spraying of potatoes, beans, corn and peas; early summer treatment of alfalfa and clover.
pre-harvest	SINOX GENERAL	As a desiccant for Seed Alfalfa, Clovers, Sudan Grass, Milo, and Flax. Also used as a chemical weed mower in orchards, vineyards, ditches, etc. — Potato Vine Killing.

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STANTOX "64"—2,4-D Amine Salt
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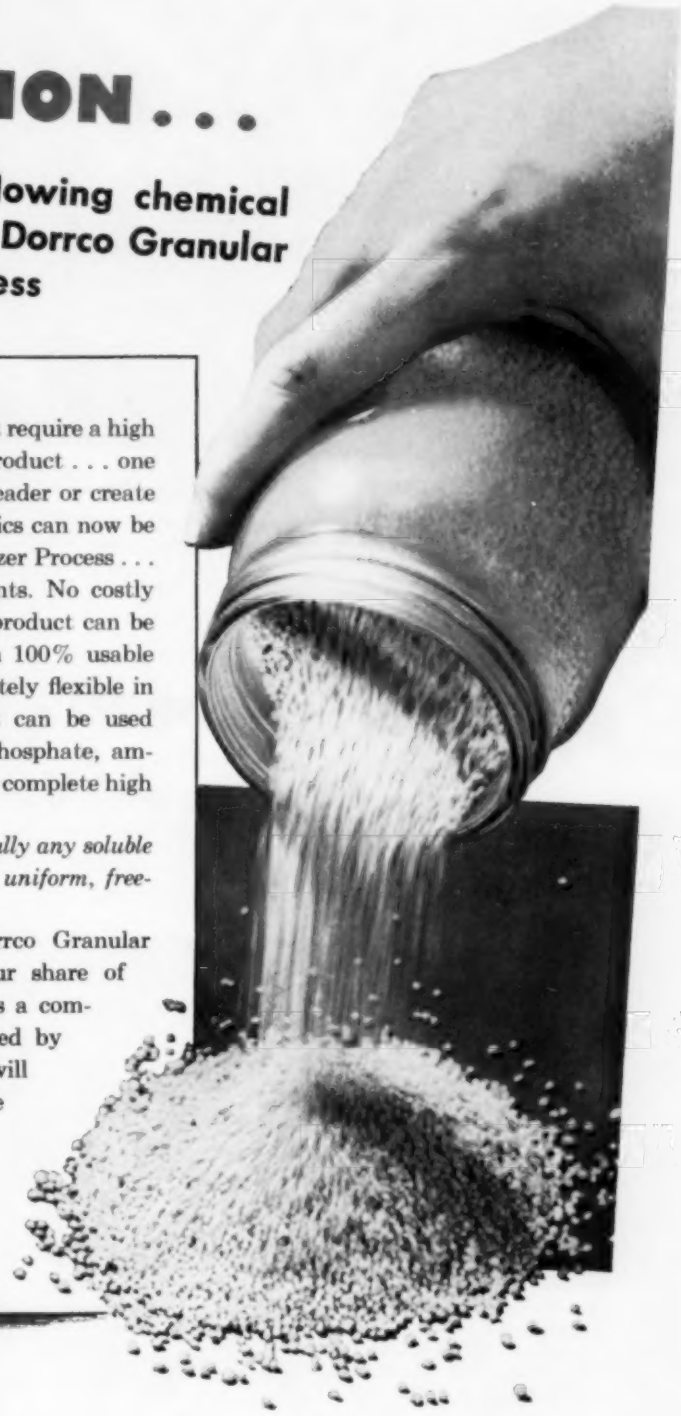
GRANULATION . . .

Key to the uniform, free-flowing chemical fertilizers produced by the Dorrco Granular Fertilizer Process



Successful sales in today's fertilizer market require a high analysis, uniform, free-flowing granular product . . . one that won't compact in storage, clog a spreader or create dust hazards. These valuable characteristics can now be obtained with the Dorrco Granular Fertilizer Process . . . applicable to both new and existing plants. No costly additives or fillers are required, and the product can be shipped direct to wholesaler or farmer in 100% usable form. What's more, the Process is completely flexible in meeting varying marketing demands. It can be used interchangeably to produce triple superphosphate, ammonium phosphates, ammonium sulfate or complete high analysis products.

In fact, the Process will granulate practically any soluble salt or mixture of salts so as to produce a uniform, free-flowing product.

There's a good chance that the Dorrco Granular Fertilizer Process will help increase your share of tomorrow's business. Dorr-Oliver operates a complete consulting engineering service backed by 35 years of experience in this field, and we will be glad to demonstrate the benefits of the Dorrco Granular Fertilizer Process in terms of your operation. Please address your inquiry to Dorr-Oliver Inc., Stamford, Conn.

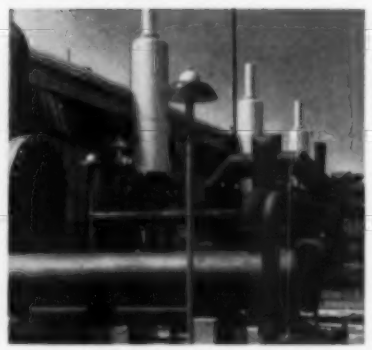
DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Serving dealers in northwest and central Iowa, this plant of the Agricultural Products Corporation is located at Webster City, Iowa. The company was established in 1947 with a 3,000 ton capacity for formulation of fertilizers on a custom basis. Since then "APC" has shown constant expansion and now has a 15,000 ton capacity.

Agricultural Products Corp.

. . . Another Spensol User

Karl H. Frantzen (above) is General Manager of Agricultural Products Corp. The President is Cecil A. Johnson.



Here is some of the modern equipment used by Spencer to produce SPENSOL Nitrogen Solutions for some of America's leading fertilizer mixers.

On time deliveries of SPENSOL solutions have helped to build Spencer's reputation for dependable service to mixers throughout the country.

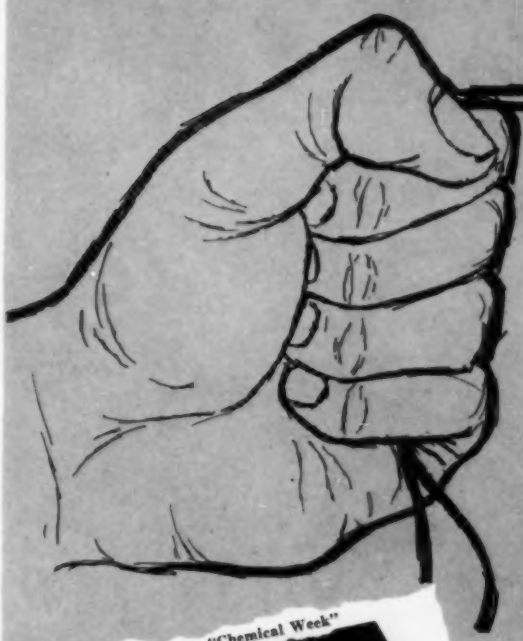
New kind of solution injector, giving better ammoniation of mixed fertilizer, was invented by H. B. Davis of Spencer Chemical Company staff.

SPENCER

SPENCER CHEMICAL COMPANY, Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Works: Pittsburg, Kans.; Henderson, Ky.; Chicago, Ill.; Vicksburg, Miss.; Orange, Texas (under construction).

America's Growing Name in Chemicals

control... your emulsifiable **BHC** concentrates



Reprinted from "Chemical Week"

new idea mart

from the EMULSOL lab

A thought or two about things new and interesting in the field of surface-active chemistry . . .

Letter with know-how

The workhorse of the pesticide industry, EMCOL H-Series emulsifiers have proven themselves over six growing seasons. Their success in handling more insecticides and herbicides, under more varied conditions than any other product, has won them "Croix de Guerre" acclaim among those who fight to conserve world supplies of food and fiber.

Blends of the new

EMCOL H-400 H-500

emulsifiers in combinations will provide greatest flexibility in performance, *regardless* of mid-season source changes.

It doesn't matter which technical BHC or solvents you use . . . or what gamma isomer percentage you formulate. Combinations of Emulsol's EMCOLS H-400 and H-500 will compensate for such variables at the lowest possible cost with the requisite ageability and emulsifiability . . . with complete *control* in your hands.

This season will prove it for you.

We will be happy to recommend the proper Emcol emulsifier blends for BHC, BHC-DDT, Lindane, etc., for your specific toxicant, solvent and formula requirements. Contact your local Emulsol representative or us directly for prompt technical service. Technical Bulletin on request.

EMULSOL CHEMICAL CORPORATION

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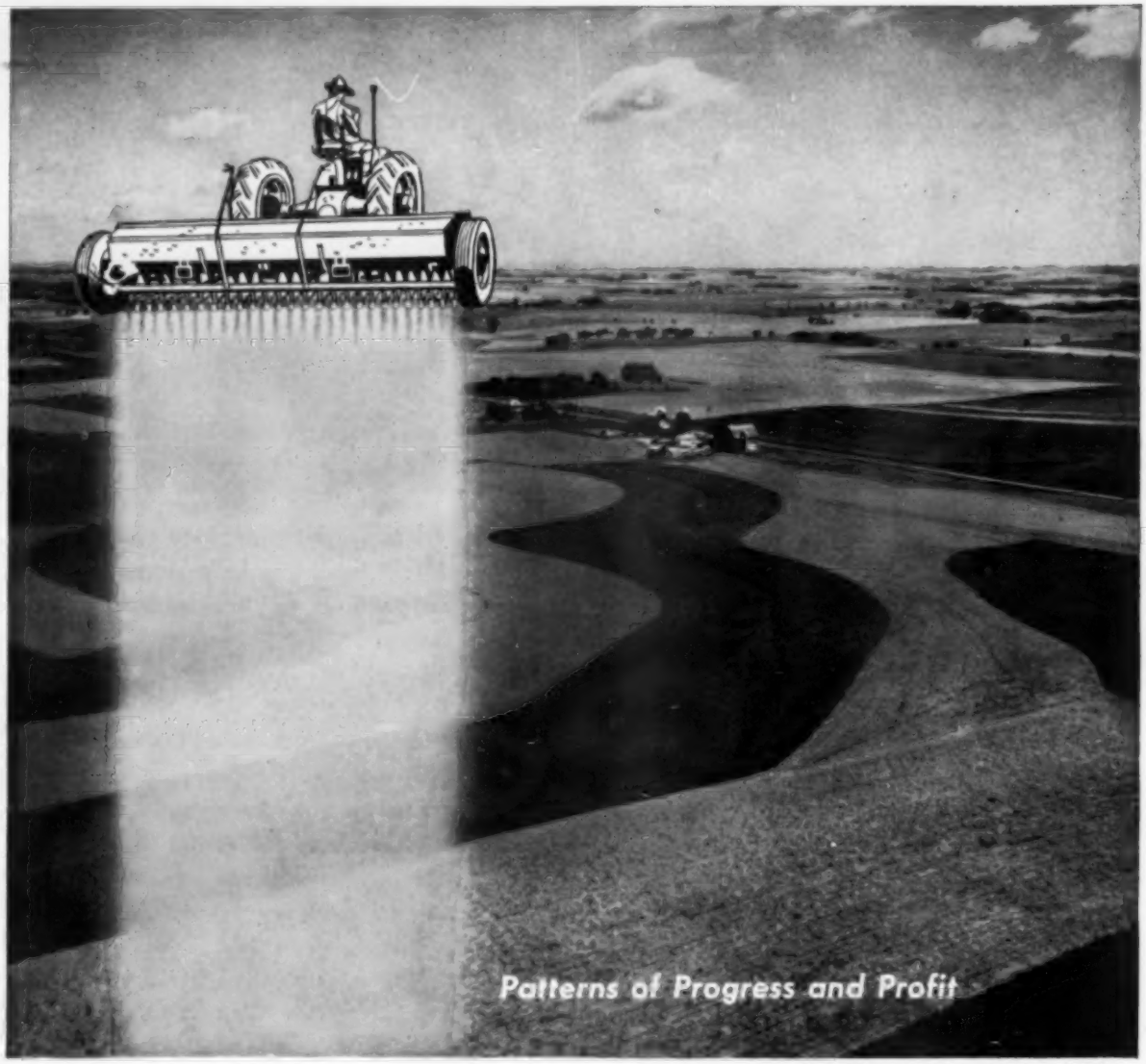

(Photo — Courtesy Soil Conservation Service, U. S. D. A.)

High Grade Muriate of Potash

by DUVAL

Duval Muriate of Potash ranks high as one of the essential nutrients which greatly increase yield and profits in crop production.

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WILLIAMS LINE IS COMPLETE

ROLLER, IMPACT and DRYER MILLS for fine grinding down to 400 mesh or micron sizes.

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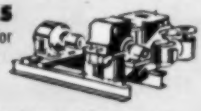
VIBRATING SCREENS, 1 to 3 decks, open or enclosed, in any size for any job.

HELIX-SEAL MILLS for dust-free grinding, and for wet, sticky, greasy materials.



Also: COMPLETE "PACKAGED" PLANTS for installation in existing buildings.

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Complete facilities are maintained by Williams to help find the right solution to every size reduction problem. Write in confidence.

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OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

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Better Glass?

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Whatever your basic chemical need—look for the answer in Trona's complete line of BORON products for industry and agriculture

Fine quality glassware and ceramics of strength, clarity and brilliance have a common ingredient with fields of lush, milk- and beef-producing pastures. They both depend on one or another of Trona's diversified line of Boron chemicals, vital to low cost, quality production in industry and agriculture. Uniformity from shipment to shipment, prompt delivery and a dependable source of supply are reasons why you will agree with the nation's leading producers that it is best to standardize on Trona® Boron products.

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Refined Pentahydrate Borax

TRONABOR®
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Soluble borate for fire-retardent water base paints

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American Potash & Chemical Corporation

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Now your aldrin and dieldrin labels can have more customer appeal! And the new, relaxed warning statements for aldrin and dieldrin products permit wider uses on farms, in homes and throughout industry.

Revise your aldrin and dieldrin labels now to include the officially accepted warning statements.

Aldrin and dieldrin formulations have achieved a new high in use and acceptance. The relaxation in classification is a vote of confidence as a response to their "good behavior" records.

For specimen labels or assistance,
contact your nearest Shell Chemical Corporation office.

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Biggest Campaign is Now Selling Your

in Fertilizer History
Farm Customers...

Just about every time farmers turn the pages of a farm magazine this year of 1955, they'll be turning to full page advertisements of one or more ARCADIAN® products. ARCADIAN UREA 45 — Nitrogen Solutions for Direct Application — *American* Nitrate of Soda — A-N-L® Nitrogen Fertilizer and others. Full pages and half pages that smack the reader right in the eye with outstanding advantages of these ARCADIAN Fertilizers that are as modern as tomorrow's agriculture. These selling messages will be seen by millions of farmers every month of the fertilizer season. Some 1500 local newspapers will also carry ARCADIAN advertising urging farmers to buy.

All this, plus continued radio campaigns on big stations, and small stations, too, are putting ARCADIAN products in the minds of your customers — to move more ARCADIAN products. As an ARCADIAN Distributor you can move them at a profit through your place of business.

This year it will pay better than ever to stock and sell ARCADIAN Fertilizers getting this intensive advertising support. Get your full quota of aids to help you sell easier, faster, more. The time is ripe — the time to stock ARCADIAN is right now. For full information, fill in the coupon below.

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45% Nitrogen Pellets

☐ **12-12-12 Granular**
Fertilizer

☐ **American Nitrate of Soda**
Improved Granular

☐ **A-N-L® Nitrogen Fertilizer**
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Meeting Calendar

Jan. 31-Feb. 1—17th Annual Meeting, National Cotton Council, Shamrock Hotel, Houston, Texas.

Jan. 31-Feb. 3—Eastern States Garden Supply Show, 71st Infantry Regiment Armory, New York City.

Feb. 7th to 8th — Seventh Annual Colorado Sprayers and Dusters Conference; Student Union Colorado A & M, Colorado A & M Campus, Fort Collins, Colo.

Feb. 7-9—Association of Southern Agricultural Workers, annual meeting, Louisville, Ky.

Feb. 7-9—Southern Division, American Phytopathological Society, Louisville, Ky.

Feb. 7th to 9th — Pest Control Conference, Oklahoma A&M College, Stillwater, Okla.

Feb. 10-11—Tenth Annual Crop, Soils and Fertilizer Conference, Oklahoma A. & M. College, Stillwater, Okla.

Feb. 10th to 11th — Third Annual Oregon Fertilizer Conference, Oregon State College, Corvallis, Oregon.

Feb. 11—New York Section, American Chemical Society, Carbide and Carbon Cafeteria, New York City.

Feb. 11th — New York Section, American Chemical Society, Symposium Agricultural Chemical Development, Carbide and Carbon Bldg., New York City.

Feb. 15-16—Fourth Annual Pesticide Chemicals School, Clemson College, Clemson, S. C.

Feb. 17-18—Middle West Soil Improvement Committee, Palmer House, Chicago.

Feb. 17-18—Joint Meeting of Midwestern Agronomists and Fertilizer Industry Representatives, Palmer House, Chicago.

Feb. 19-23 — National Canners Association, 48th Annual Convention, Conrad Hillton Hotel, Chicago, Ill.

Feb. 23-25—Use of Aerial Equipment in Agriculture, 4th Annual Conference, Purdue Univ., Lafayette, Ind.

Feb. 23-25—Midwestern Chapter, National Shade Tree Conference, Chase Hotel, St. Louis, Mo.

Feb. 28-March 1—Fertilizer Section, Southern Safety Conference, Jung Hotel, New Orleans, La.

March 1-3—Pest Control Operator's Short Course, Pennsylvania State University, State College, Pa.

March 7-9—National Agricultural Chemicals Association, Spring Meeting, Chase & Park Plaza Hotel, St. Louis, Mo.

March 8-9—Western Cotton Production Conference, Hotel Westward Ho, Phoenix, Ariz.

March 22-24—National Farm Chemurgic Council, Dashler-Hilton Hotel, Columbus, Ohio.

March 24-25—N. Central States Branch, E. S. A., East Lansing, Mich.

May 19—Fertilizer Section, 25th Annual North Carolina Safety Conference, Winston Salem, N. C.

June 12-15—National Plant Food Institute Convention (Joint meeting of APFC and the NFA), The Greenbrier, White Sulphur Springs, West Va.

June 28-30—Regional Fertilizer Conference, Pacific Northwest Plant Food Association, Boise Hotel, Boise, Idaho.

Nov. 29-Dec. 2—Entomological Society of America, Annual Meeting, Netherlands Plaza, Cincinnati.

"bum's rush" for bugs

Confronted with modern insecticides, bugs can only "hit the road." To assist formulators in giving insect pests the bum's rush, Neville offers its readily available NEVSOLVS. These high-boiling, uniform solvents promote ease of formulation at low cost.

Write for samples today.

NEVILLE AROMATIC SOLVENTS

NEVSOLV 200		NEVSOLV 30
195°C (383°F) to 280°C (536°F)	Boiling Range	130°C (266°F) to 190°C (374°F)
.890 to .915	Specific Gravity	.835 to .845
Straw	Color	Water White

NEVILLE

These NEVSOLVS are active solvents for DDT, BHC, 2-4-D esters, etc. Especially clean, good odor. Each grade has individual characteristics but other boiling ranges are available.

NEVILLE CHEMICAL CO. • PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal. AC-3

U. S. Industrial Chemicals Co.
announces the opening of its new

Synthetic Ammonia and Fertilizer Nitrogen Solutions Plant at Tuscola, Illinois

January *1955*

This new strategically-located plant in Tuscola, Illinois produces 50,000 tons per year of anhydrous ammonia. Part of it is converted into nitric acid which is transformed into ammonium nitrate by reaction with more ammonia. In turn the ammonium nitrate is used in the manufacture of nitrogen solutions composed of nitrate and ammonia in water.

The new unit is adjacent to the USI sulfuric acid installation which came onstream in September, 1953. Thus two of the most important chemicals for agriculture are available from this plant site.

The USI ammonia plant goes onstream in time for heavy springtime demand for fertilizer nitrogen. It is an economical source for consumers in Illinois, Indiana, Ohio, Michigan, Wisconsin, Minnesota, Iowa and Missouri.

Included in the products to be available from this plant are both commercial and refrigeration grades of anhydrous ammonia and all formulations of ammonium nitrate — ammonia solutions. Special formulations can be tailored to the user's requirements.

For further information about how this new plant can serve you, please address your nearest USI office, or communicate with Chemical Sales, U. S. Industrial Chemicals Co., 99 Park Ave., New York 16, New York.

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Editorial
COMMENTS

WITH the opening of a new insecticide season just a month or two ahead, the trade is naturally doing some speculating as to what sort of a year 1955 may be from the sales and profit standpoints. Understandably too there may be the usual spring optimism that 1955 will be better in both respects than the past three rather unsatisfactory years in the insecticide business.

With the current campaign being conducted by the Food and Drug Administration to institute legal action against grain contaminated by insects or rodents, it would seem quite probable that sale of pesticides, fumigants and rodenticides for use in this direction can be expected to pick up considerably over the coming season. A widened market is a very definite probability here for concerns that are alert to the sales opportunities presented. In the home garden field manufacturers of small packages of various pesticidal chemicals are reported to be swinging to aerosol type dispensing containers in increasing numbers. If the experience of other lines, in which adoption of the aerosol package has boomed sales, is any criterion, we can optimistically expect an upward surge in this home garden market for 1955.

But to tap new markets, and to find new users of agricultural chemicals to keep the sales curve swinging upward, it is very apparently going to take new products and new approaches to the market, this year and in the years to come. Those who sit back with the same products, the same packages, the same potential lists of customers who made 1950 and 1951 big profit years in the insecticide business can figure to do poorly. The market for cotton poisons can apparently no longer be counted on to provide a big back log of business and guarantee profits across the board.

Trash examinations made recently in Georgia, and reported in this issue (see pg. 58) show the lowest survival count for weevils since the USDA started to keep records four years ago. Live weevils were found on only fourteen per cent of the farms examined. And in North Carolina, boll weevil carryover is reported to be the lightest in years. For a profitable insecticide business this year, and perhaps for the future, the trade is going to have to develop products and customers to replace the vanished business in cotton poisons.

THE United States, which for years has been a substantial importer of nitrogen, may in the foreseeable future reverse this historical pattern and become an exporter. As one new anhydrous ammonia plant after another comes into production, and with still others in various stages of completion or perhaps still on the drawing boards, it becomes evident that we are approaching a limit to how much of our new nitrogen supply we can continue to absorb in the domestic market. Trade authorities estimate that we are currently over-producing anhydrous ammonia by six or seven percent, and this figure may well rise as new production comes in.

The strength of the situation, however, lies in the fact that in the world market nitrogen is still in short supply. Those producers of anhydrous who are not restricted to the sale of their output as ammonia in the direct-application

(*Continued on Page* 120)

Fertilizer, Pesticide Use in Mexico

By J. C. Harrar
The Rockefeller Foundation
New York City

TRADITIONALLY Mexico has not relied heavily on agricultural chemicals as aids to crop production. In the past, this has been caused by such factors as unfavorable trade balances, inadequate transportation systems, limited power facilities, restricted agricultural credit and lack of mechanization. During the last decade, however, this earlier picture has changed radically. Throughout the country, areas once remote are now accessible by road, air, and to a lesser extent rail; rural electrification is becoming available in hitherto out-of-the-way areas; and agricultural credit is becoming more plentiful, with increased use of agricultural machinery and chemicals.

During the same period, other important innovations have occurred, including developments in agricultural education, research and extension directed toward modernization of methods and materials for maximum production. And it is upon these three phases of agricultural science that Mexico must depend for sustained achievements in improving both the quantity and the quality of its plant and animal production. Progress has necessarily been deliberate, and much remains to be accomplished in the years ahead. However, there is a growing body of essential information, an increasing supply of prime agricultural materials, and an enlarging corps of well trained agricultural scientists in Mexico. These give promise of accelerated future progress.

Mexico is most often thought of as primarily a producer of corn, although actually it has a highly diversified agricultural industry. Major crops in addition to corn include wheat, barley, beans, chilies, sugar cane, coconuts, coffee, citrus, cotton, grapes and bananas. Also important are cucurbits, potatoes, vegetables, sorghum, tree fruits, pineapple and forage crops. Agricultural production long has been concentrated on the central plateau, which is the principal population center, but there has been notable geographic extension during the past several years. Sonora in the northwest, the Laguna area in the northcentral section, and the Matamoros region in the northeast just south of the Rio Grande all have become important centers of agricultural production. There has also been increased emphasis on tropical agriculture, principally along the Gulf of Mexico, with a major development in the Papaloapan River Valley. As a result, there has been a marked increase in the demand for modern aids to production and among these agricultural chemicals are of primary importance.

Chemical Fertilizers

STUDIES of the fertility levels of the soils in the most important food-producing areas in Mexico make it clear that the greatest single chemical need in support of agricultural production is fertilizer, and as might be expected, the element which is deficient most often is nitrogen. Years ago many of these soils were relatively rich in nitrogen, but continuous monoculture has reduced the level of fertility in some areas to a minimum. Coincidentally, local crop varieties have been selected for conditions of rusticity and low fertility, and these are characterized by low yields.

Presumably the general application of chemical fertilizers would result in great increases in these average yields, but while it is true that the majority of the soils respond to applications of fertilizers containing nitrogen, results have often been both disappointing and uneconomic. In some instances, this fact has led to

doubts concerning the value of chemical fertilizer, and in 1940 Mexico was using only a few thousand tons of chemical fertilizer, most of which went into the production of sugar cane and cotton.

The reason for the disappointing results with chemical fertilizers was largely their use in relation to traditional methods of soil management and with unimproved varieties of crop plants. Inadequate seedbed preparation, poor stands and inefficient rates of fertilizer application and placement with reference to available water all contributed, and it was not until methods and materials were improved that the use of fertilizer became more attractive.

During the 1940's research efforts began to accrue in the form of improved varieties of food plants, notably corn (12, 11, 14, 15), wheat (2, 3, 1), and beans (13). At the same time, Mexican soils were being studied to ascertain their fertility levels (5, 7). As a result of hundreds of widely separated experiments, it was found that approximately three-quarters of all the soils investigated responded to applications of nitrogen, approximately 35 per cent to phosphorus, and approximately two per cent to potash. Lime usually is not needed.

Photo on Facing Page: Dusting corn with a "Buffalo Turbine" using 5 per cent DDT for control of cutworm and army worms, Palmira, Valle, Colombia.
Top Left Photo: The response of corn to phosphorus fertilization in an experiment near Maravatio, Michaocan. The corn on the right received 40 kg./ha of nitrogen, phosphorus (P_2O_5), and potassium (K_2O). The corn on the left received the same application of nitrogen and potassium but did not receive any phosphorus.
Bottom Left Photo: Fertilizer application on grass plots, Chapingo Station, Chapingo, Mexico, 1933.

Response on the part of the native or so-called "criollo" varieties usually was only fair, but when the new improved varieties and hybrids were tested, the responses were striking. Laird *et al* (7) found that the average increase in corn yield per hectare when nitrogen was applied at the rates of 20, 40, 60 and 80 kilos was .71, 1.04, 1.39, and 1.41 long tons per hectar, respectively. In at least one area (Jalisco) repsonses to nitrogen with phosphorus have been striking in that the application of a 40-40-0 formula increased the yield of improved wheat varieties by one ton, an 80-80-0 formula by two tons, and a 120-80-0 formula by three tons.

Today in Mexico there are sound bases for application of chemical fertilizers for increased crop yields. The various soil types are recognized, their fertility levels are known and their probable response to fertilizer application can be predicted. Time, rate and placement data are available, as are data concerning planting rates, optimum stands and the use of chemical fertilizers on irrigated and non-irrigated fields. In consequence, demand for commercial fertilizers has been increasing each year, and it is believed that the critical factor in increasing yields of crop plants during the next several years will be the availability of fertilizers containing nitrogen and phosphorus. This, of course, presupposes their proper use in terms of rate and time of application, available water and the use of improved varieties. Gross consumption in 1954 has been calculated at less than 300,000 tons, but unofficial estimates of the probable demand for 1955 approach 800,000 tons.

Although by-products of Mexican oil fields offer possibilities for greatly expanded production of ammonium sulfate, at the present there is only a single plant in operation, with a rated capacity of between 200 and 250 tons per day. At least three other plants are contemplated with an estimated total production capacity of 600,000 tons annually. Chilean nitrate and ammonium sulfate from the United States are the principal sources of Mexico's chemical fertilizer imports.

but these have not been large in terms of total needs even though their value has reached a maximum figure of $12 million in a single year. Currently there is a growing interest in northern Mexico in the use of imported anhydrous ammonia. Phosphate is usually available in the form of superphosphate largely derived from imported phosphate rock treated locally.

From the foregoing it will be seen that chemical fertilizers are just beginning to play their proper role in crop production in Mexico. As additional research results accrue, and as these are conveyed to farmers by extension agents, demand will increase steadily and this will eventually have to be met by making available to farmers adequate quantities of chemical fertilizers at prices which will permit their general use where needed.

Pesticides

THE use of pesticides is rapidly becoming more common in Mexico although great gains in this area are yet to come. Initially, insecticides were used principally for protection of cotton and bananas, but today numerous other crops such as citrus, potatoes, grapes, and beans are beginning to receive chemical treatment for pest control. Total quantities of pesticides used are small, but these are increasing each year. As a result, a greater variety of compounds is becoming available locally, and a number of small mixing plants have been established. The willingness of the producers of insecticides and fungicides to provide experimental quantities of their products has been a great stimulus to this development.

The following selected list includes the more important crops grown in Mexico, the principal pests and diseases attacking them, and chemical control measures:

Bananas—The most important disease of this crop is the Sigatoka or Chamusco disease caused by a species of the fungus *Cercospora*. The pathogen is destructive and, unless controlled, may destroy the banana industry in infested areas. Fortunately, sprays containing copper are quite effective, and their use on an appropriate schedule will keep the disease in check. Spraying with copper fungicides is regularly practiced in commercial banana plantations.

Cotton—Principal parasites are the pink bollworm, the stem borer, seedling blight, Texas root rot and wilt. Dusting with benzine hexachloride is regularly practiced to control the insect pests, and seed treatment with organic mercury compounds has been found helpful in the control of seedling blights (6).

Potatoes—Late blight, caused by the fungus *Phytophthora infestans*, and virus diseases are the principal causes of losses in potato production, and when potatoes are grown during the rainy season a regular spray schedule must be established. Bordeaux mixture or similar sprays containing copper are still used most widely, but other compounds such as Manzate, Dithane Z78 and Parzate have also been used with success. The virus diseases are spread through potato fields by insect vectors, and mixtures containing DDT frequently are used to control them.

Beans—This important crop is regularly subject to attack of the bean pod borer (8), the Mexican bean beetle, viruses, anthracnose, bacteriosis and root rot (16). The insect pests can only be controlled through application of insecticides such as parathion and DDT; and fungicides containing copper are useful in reducing losses from pathogenic fungi. The use of pesticides for increased bean production is gaining popularity in such important bean-producing states as Puebla, Aguascalientes, Zacatecas, and Durango.

Other Agricultural Advances

VEGETABLE production in Mexico is slowly becoming more widespread and less limited to urban areas and to commercial plantings for export. In response to this development, pest and disease problems of vegetable production are being studied, and it is clear that pesticides are important to this effort. Benzene hexachloride and parathion are being used effectively for control of certain vegetable pests, and Systox has been found of value in connection with vegetable plantings for seed production. (10).

Seedling blights of crop plants are common, and many of these can be controlled by seed treatment. Although the practice is by no means universal, seed treatment for the control of seedling blights of cotton, vegetables, corn, wheat and beans has been found to be effective under certain conditions and in specified areas. It is expected that the use of seed disinfectants will increase. (6, 10).

As agricultural production increases, the problem of storage grows in importance. Insect pests and molds of stored grains, and diseases of plant parts such as bulbs, corms and tubers all require chemical control, and there is growing use of seed disinfectants, insecticides and fumigants for this purpose. Organic mercury compounds, methyl bromide, DDT and carbon disulfide all have been used with satisfactory results.

Although nematodes are recognized as important in limiting crop production in Mexico, relatively little attention has as yet been given to them or to their control. As additional information becomes available with regard to the role of nematodes in reducing the production of potatoes, tomatoes, and other crops, it is expected that the necessity for the use of larvacides or nematocides to combat them will become evident.

Mosquito control is widespread largely as a result of successful activities over a period of years involving DDT to control malarial mosquitoes. This, along with other products is now being widely used in rural communities for control of mosquitoes, flies and other pests.

Stable flies are real pests in Mexico, especially in connection with milk production. The milkshed area in the vicinity of Mexico City presents a serious fly problem, and it has been shown that fly nuisance may reduce milk production by as much as one liter per day per animal. Recently careful experiments have shown that three sprays a year in conjunction with reasonable sanitary practices keep flies at a minimum through-

(*Continued on Page* 137)

Outline of the NEW YORK STATE EXPERIMENT STATION at Geneva, N. Y.

Top Left: Portion of pilot plant tomato juice line. The study had to do with relation of grade of raw tomatoes to grade of finished juice.

Bottom Left: Seed-corn maggot control in beans with combination fungicide and insecticide seed treatment. Row 4, combination treatment; row 2, fungicide alone; row 1, no treatment; rows 5 and 9, insecticides alone.

Top Right: Control of wild mustard in pea fields with chemical sprays.

Bottom Right: Trueness-to-type trials of packet flower seeds.

HORTICULTURAL research with special emphasis on problems related to the production and processing of fruits and vegetables grown in the Empire State is among the prime considerations of the New York State Agricultural Experminent Station at Geneva, N. Y. Founded by the act of the Legislature of 1880, the Station's program has always been closely integrated with research under way at the New York State College of Agriculture at Ithaca. In recent years, the integration has been carried further, embracing other units in Cornell University.

Under the direction of Dr. Arthur J. Heinicke, a staff of 70 scientists, aided by a number of technicians and field assistants is engaged in investigations in food science and technology, control of insect pests and diseases of fruits and vegetables, the breeding of improved varieties, the development of better fertilizer and cultural practices to procure higher yields of more nutritious processed foods, the chemical control of weeds, improvement of seeds and rootstocks, and many other related projects.

New York ranks third in the United States in the production of vegetables for processing. Three tomatoes developed at the Station—Gem, Red Jacket, and Longre—now occupy practically the entire canning tomato acreage in the State. A new paste-type tomato—Red Top—is rapidly monopolizing the processing field for paste and puree. Vegetable breeders are also searching for white-seeded snap beans and a high-yielding high-quality strain of Boston Marrow squash to meet definite specifications of baby food manufacturers. Peas, sweet corn, broccoli, and other vegetables are also receiving attention from the plant breeders, with special stress on disease resistance.

Fertilizer, rotation, and irrigation experiments with vegetable canning crops serve as a guide to growers for the most efficient and economical production of these crops. Minor element deficiencies have come to the front with certain crops, particularly boron in beets and broccoli. Fertilizer borate has proved a boon to growers in meeting boron requirements.

Chemical weed control in vegetables offers much to the canning crop grower, but it is not as simple

as it sounds. Mustard and other broad-leaved weeds in peas are now readily controlled, but some other weeds still bother the pea grower. 2,4-D injury plagues the sweet corn grower, and a truly satisfactory chemical control of weeds in beets similar to that for carrots is still in the future. Some of the new organic materials show promise of solving these and other weed control problems.

Placement tests with chemical soil conditioners are underway to find procedures that will reduce cost of treatment, particularly on land to be used for carrots, beets, and beans.

The Station does all of the official seed testing for the State. In addition, the seed analysts conduct research on the effect of chemical seed protectants on germination both immediately after treatment and on seeds held in storage. Technics for determining the kind and amount of chemical protectant applied as well as the adequacy of the treatment in controlling seed-borne fungi have been developed and are widely used in other seed testing laboratories.

Seed quality measurements and genetic purity tests of seed stocks engage the attention of the seed analysts. They also pioneered the idea of trueness-to-type trials in which seedsmen may compare their stocks side by side with those of their competitors for actual field performance.

The Geneva Station was recently designated as the Northwestern Regional Plant Introduction Station. A vast amount of plant material is being assembled, grown, and evaluated for its possible genetic value to plant breeders throughout the Northeast and elsewhere.

Fungicides Investigated

THE steady stream of new fungicides and insecticides coming on the market must be screened in the laboratory, greenhouse, and orchard. This requires a team effort on the part of entomologists and plant pathologists to test the compatibility as well as the effectiveness of these new materials. The increasing use of New York State fruits and vegetables in the manufacture of baby foods has further intensified the search for *safe* as well as effective pesticides.

It was by means of such screening tests that Fermate was first demonstrated at Geneva for scab and rust control and for its nutritive qualities, to mark the beginning of the era of organic fungicides.

Another "first" at Geneva was the development of a scientifically selected fruit tree oil spray. Paraffinic in nature, it has proved safer for the tree and more effective against insects than old type oil sprays. Designated as "superior type" oil, it is sold under specifications drawn up by Station chemists and entomologists. It has now superceded earlier type oil sprays in New York and is used widely in the Northeast and in Canada.

Another notable development now adopted as a routine measure is the use of a combination of an insecticide and fungicide for protection of seeds of beans, sweet corn, squash, and other crops against seed decay organisms in the soil and seed corn maggot and wire worm attack.

In fact, much of the pioneer work on the use of chemicals as seed protectants was done at Geneva. In the early thirties, red copper oxide was developed. Early in the forties, chloranil or Spergon was shown to be highly effective. Since then, hundreds of tests have been made with new protectants with emphasis on combinations of fungicides and insecticides.

DDD is providing the answer to a come-back try by the red-banded leaf roller in New York orchards. Substitutes for DDT for codling moth are on trial, stimulated by an indication that this pest may be developing resistance to DDT.

A succession of relatively mild winters is believed to account for outbreaks of Stewart's wilt disease of sweet corn. First described by the late Professor Fred C. Stewart of this Station, this bacterial disease is carried through the winter by the corn flea beetle. DDT is giving good control. Also, streptomycin applied as a foliar spray has prevented spread but does not cure infections.

Invasions of the State by the Mexican bean beetle, the European corn borer, the Japanese beetle, and more recently, the European chafer, have been met by the entomologists and brought under control.

Application Equipment

STATION entomologists and plant pathologists are working closely with agricultural engineers at the College of Agriculture at Ithaca on developing new equipment for applying pesticides more economically and more efficiently. A tractor-mounted row-crop sprayer suitable for use on beans, carrots, and cabbage has been constructed by modifying a weed sprayer. It requires only 15 to 20 gallons of spray mixture to the acre as compared with 150 gallons for standard spray equipment.

Air-blast sprayers for use in orchards and vineyards are being thoroughly investigated. These machines can be operated by one man as compared with two or three men required on a standard hydraulic sprayer. They also make possible the use of concentrated spray mixtures, thus reducing considerably the amount of water required. Entomologists and plant pathologists are constantly testing pesticide combinations in dilute and concentrated form in air-blast and other kinds of equipment.

Powdery and downy mildew control in vineyards is now possible with applications of 5 to 10 gallons of spray mixture per acre with air-blast equipment, as compared with 150-gallon applications heretofore.

Soil fumigation with ethylene dibromide before setting out the bed has increased strawberry yields by as much as 37 per cent by reducing the nematode population of the soil.

Tomato spraying experiments in the late thirties and early forties led to the development of a split schedule in 1944, using ziram and copper. As a result, when a late blight epidemic struck New York tomato fields in 1946 and 1947, growers had a control measure immediately available that saved them millions of dollars. Even better protection is now available with maneb and captan.

Phoma rot of beets that may cause rejection of an entire load at the processing plant because of an occasional infected beet has been diagnosed and the relationship of the malady to boron deficiency in the soil demonstrated.

Ferbam has been shown to be highly specific for cedar-rust in Hudson Valley orchards. It is also proving most effective against black rot of grapes, reducing the required number of sprays from five to three and increasing vine growth and yield. It gives remarkably good control of peach leaf curl. It has been found to increase apple yields.

Much work has been done on control of apple scab and cherry leaf spot after infection takes place. Actidone is now being used for after-infection control of cherry leaf spot. After-infection sprays with mercurials such as phenyl mercury acetate are controlling scab three days or more after infection begins, thus enabling growers to reduce the number of sprays by waiting for rainy periods which bring on infection. Use of urea as a foliar spray to regulate the nitrogen supply of apple trees was initiated at Geneva.

Food Science Program

THE Station Scientists consider as important as pest control the effect of the spray program on yield and quality of fruit, including size, color, and "finish," on the health and vigor of the tree year after year, and the cost. All are weighed in determining the economy and efficiency of a spray program.

Several heretofore unidentified troubles of fruits and vegetables are not known to be due to virus infections. No spray or soil treatment reaches them. Plant pathologists at the Station are "indexing" virus-free bud stocks for cherries and peaches and are selecting virus-resistant strains of fruits and vegetables.

When New York State fruits and vegetables reach the processor, still other problems arise and another segment of the Station personnel comes into the picture—the food scientist and technologist. "Food Science and Technology" means many different things at Geneva. It means the isolation and identification of bacteria involved in the fermentation of vegetables, such as sauerkraut and pickles, and many other factors that contribute to high quality of processed foods.

It means improved technics for making fruit juices using ascorbic acid as an anti-oxidant to preserve to a high degree the original flavor, aroma, and color of freshly pressed fruit juices.

"Food Science" involves the development of new uses for New York products, such as apple ice cream, white grape juice, and sherbet and ice cream made from the juice of the Niagara grape.

Construction of a pilot plant that duplicates commercial processing lines on a small enough scale for food scientists to study with precision the factors affecting quality of processed foods is part of the program. Much of the pilot plant equipment is designed and built in the Station's own machine shop.

Pilot plant studies have made possible a comprehensive investigation of the relation of grades of raw tomatoes to the grade of the finished juice in cooperation with the U. S. Department of Agriculture. Pilot plant lines have also been set up to study the processing of apple slices, the tank scald of cherries, and to aid in dehydration tests with peas and snap beans for the Army Quartermaster Corps, to mention a few of their uses.

"Food Science" embraces processing plant sanitation. An extension study has been made of a number of quaternary ammonium compounds used in cleaning operations around canning factories.

Yet other "terms" study the many aspects of the freezing preservation of foods. Which varieties will give the highest quality frozen product? Just what chemical reactions take place during frozen storage that may affect flavor, color, texture, and quality? What are the chances for bacteria present on the raw product to survive quick freezing and frozen storage? Answers to these and many other questions on freezing preservation of foods are coming from the laboratories of the Station's Department of Food Science and Technology.

Studies of the pectin substances in fruits and vegetables throw light on their role in processed foods. Out of this work has come the almost universal practice by commercial tomato canners of adding calcium chloride to firm up and preserve the shape of canned whole tomatoes.

Unraveling the complex chemistry of coloring matter in strawberries has aided preservers in supplying more attractive products. Precise chemical, microchemical, and microbiological methods have been developed for identifying and measuring chemicals added to foods.

A scientifically run taste-testing panel is an important tool of the food scientists at Geneva and serves other departments as well. The panel plays an important part in screening pesticides and soil treatments, for example, that may affect flavor, color, or other quality of processed foods.

Members of the Food Science Department study 2,4-D absorption and distribution in plants, the structure of proteins, spray residues on fruits and vegetables for safety to consumers and as an index to the most efficient methods of applying pesticides. They also carry on the official chemical inspection of all commercial feeding stuffs, fertilizers, and pesticides offered for sale within the State.

Fruit Research at Geneva

N. Y. Experiment Station investigators are also working at the Vineyard Laboratory in the western New York grape belt, at the Hudson Valley Fruit Investigations Laboratory at Poughkeepsie, and in commercial orchards and vegetable crop plantings around the State where specific problems arise.

Fruit is a tradition at Geneva. New varieties introduced at the Station have spread far and wide. Among those now in commercial production are the Cortland, third in apple production in New York State, the Milton and Macoun apples, the Gorham

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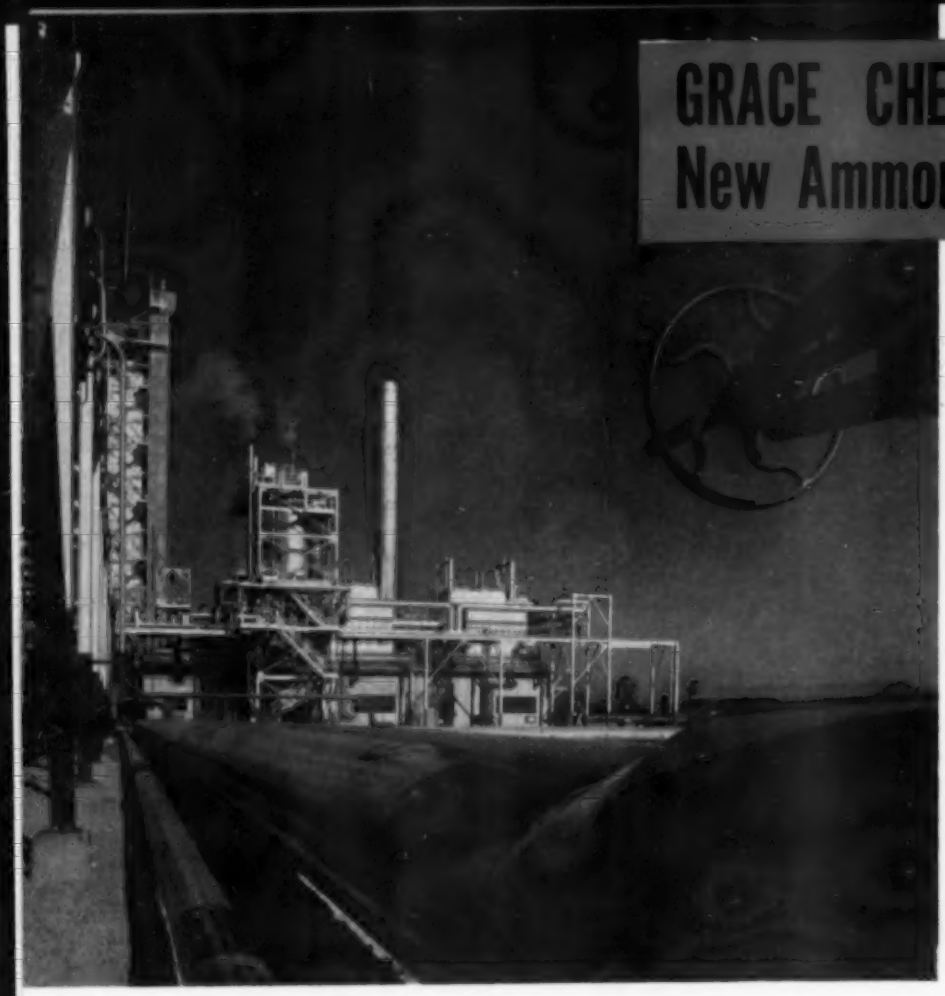


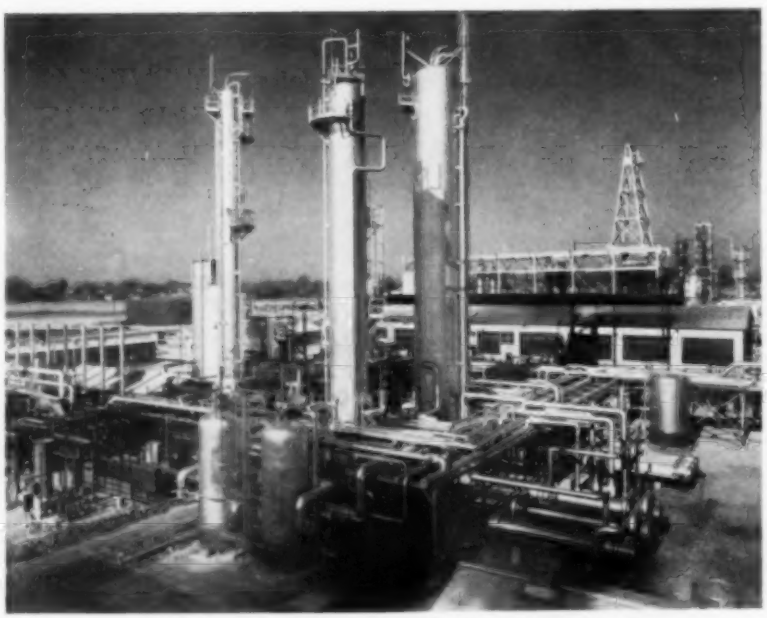
GRACE CHEMICAL OPENS New Ammonia-Urea Plant

GRACE Chemical Company dedicated its new anhydrous ammonia-urea plant at Memphis, Tennessee last month in ceremonies held January 6 and attended by upwards of 500 people, including executives connected with the numerous Grace enterprises, friends from the agricultural chemical industry, representatives of the government and figures prominent in the agricultural life of the nation. This newest addition to the country's growing list of facilities for production of anhydrous ammonia and urea cost just short of $22,000,000. It occupies a 277 acre site, employs about 235 persons, and will have an annual payroll in excess of $1,000,000.

The new plant was first projected a little over two years ago when Grace Chemical Company was organized as a subsidiary of W. R. Grace and Company, to put this century-old firm, whose diverse interests include agriculture, trading, manufacturing, steamship lines and airlines, into what is a relatively new field

Top photo: In the foreground are the 36-inch cooling water lines at the new nitrogen plant of Grace Chemical Company. At the center are the twin steam boiler units and in the left background, the urea prill tower. The plant will manufacture anhydrous ammonia and urea for both agricultural and industrial uses.

Overall view of the new nitrogen plant. The towers in the foreground, from left to right, are the synthesis gas caustic scrubber, the CO_2 absorber, and the MEA reactivators. The ammonia will be marketed primarily in the Mid-South and lower corn belt areas, while the urea will be sold nationwide and exported.

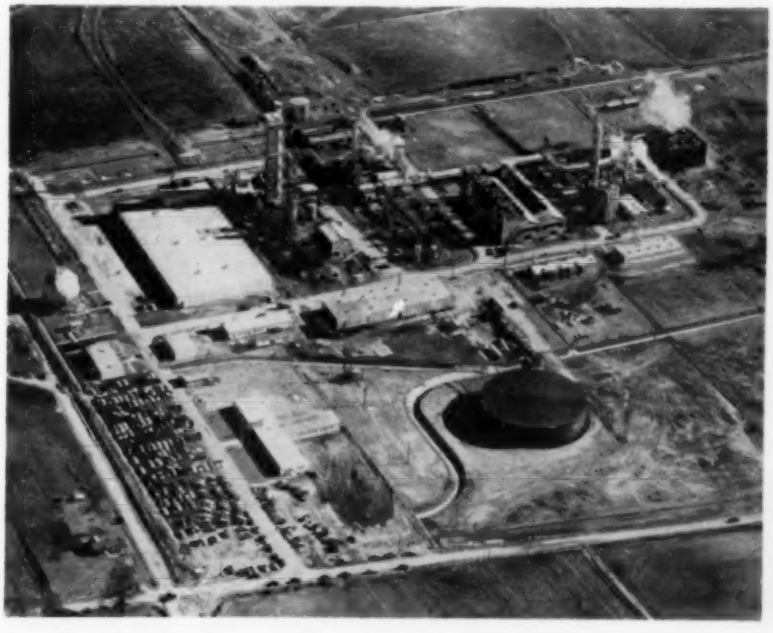


for them, at least on this scale,—agricultural chemicals.

Other operating units of the Grace organization in the agricultural field include Davison Chemical Co., Baltimore, acquired by Grace in May, 1954 and now operated as a division of W. R. Grace & Co., and Naco Fertilizer Co., a Grace subsidiary since 1907 and now incorporated in the Davison Chemical Co. Division. Thus while Grace's entrance into anhydrous ammonia and urea production is recent, through the Davison and Naco units they have been in the agricultural chemical field for more than a hundred years.

The decision to make the first operating unit of Grace Chemical Company an anhydrous ammonia-urea plant was made only after a lengthy survey of the field for a number of years following the close of World War II. Their decision to build the ammonia-urea plant in Memphis was based on the belief that the petrochemical field still offers great possibilities for further substantial growth, and that Memphis offers an excellent growing market area conveniently situated in relation to low cost power and economical river transportation, as well as railroad lines.

Rated capacity of the new plant is 250 tons of ammonia per day, of



Top photo: This view of the new ammonia — urea plant shows the Texaco Partial Oxidation units used for the manufacture of synthesis gas. In the background the three tall towers are, from left to right, the MEA reactivator, synthesis gas caustic scrubber, and the CO_2 absorber.

Photo at left: Aerial view of the new $20,000,000 anhydrous ammonia — urea plant located at Woodstock, near Memphis. Production of ammonia was begun on December 21, 1954, and manufacture of urea was to get underway by late January.

which 100 tons can be converted into 150 tons of urea. The first tankcar load of anhydrous ammonia was shipped from the new plant on December 21, when U. C. Ellis, general superintendent of the Plant Food Division of Swift and Company accepted delivery of the initial car from John Carriere, plant manager for Grace in Memphis. The plant was expected to begin producing urea before the first of February, and the whole operation should shortly reach or, it seemed probable, exceed its rated capacity (scheduled at 90,000 tons of ammonia and 54,000 tons urea annually.) Principal market area for the ammonia will be in the Mid-South region and in the lower cornbelt, while urea will be sold nationally and also exported. Operation of the two plants is extremely flexible and there is ample storage space for any ammonia which may not be needed immediately for operation of the urea plant or for immediate sale for direct application. The urea plant can adjust readily for production of varying quantities of fertilizer-grade or industrial-grade urea.

In selecting its processes and designing its equipment Grace chose to use an air-separation plant designed by Air Products, Inc. to split air into nitrogen and oxygen, the Texaco partial oxidation process for the manufacture of synthesis gas, the Casale ammonia process for production of ammonia, and the Pechiney process for the manufacture of urea. The decision to use the Texaco and the Pechiney processes was something of an industrial gamble, for neither had been employed previously, in the United States at least, on a full commercial scale. However, both had been thoroughly tested in pilot plant operation and the Grace engineers indicate they have been thoroughly satisfied with the way the two processes have worked out up to this point on a commercial basis.

The Texaco Partial Oxidation Process was selected as being the most modern and flexible method for the production of hydrogen. It offers the advantage that it can operate on natural gas or practically any refinery gas, saturated or unsaturated. The catalyst used is inexpensive, and is not subject to poisoning by sulfur or to being coked up by unsaturated hydrocarbons. Contaminants, such as carbon dioxide, nitrogen, hydrogen sulfide or other sulfur-containing gases do not result in direct adverse process effects. The process is extremely simple and flexible, and because extensive instrumentation is employed, laboratory controls may be reduced to a minimum.

The Casale process for production of ammonia, of Italian origin, is a tried and tested process which has been accepted all over the world. Its principal operating feature as compared with other processes, is its use of an ejector to move the unconverted nitrogen and hydrogen back into the reactor, instead of a compressor which

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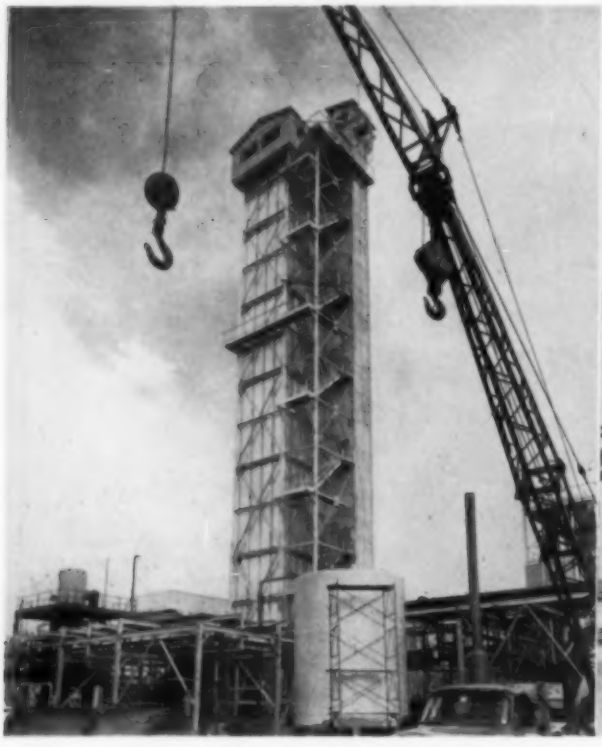
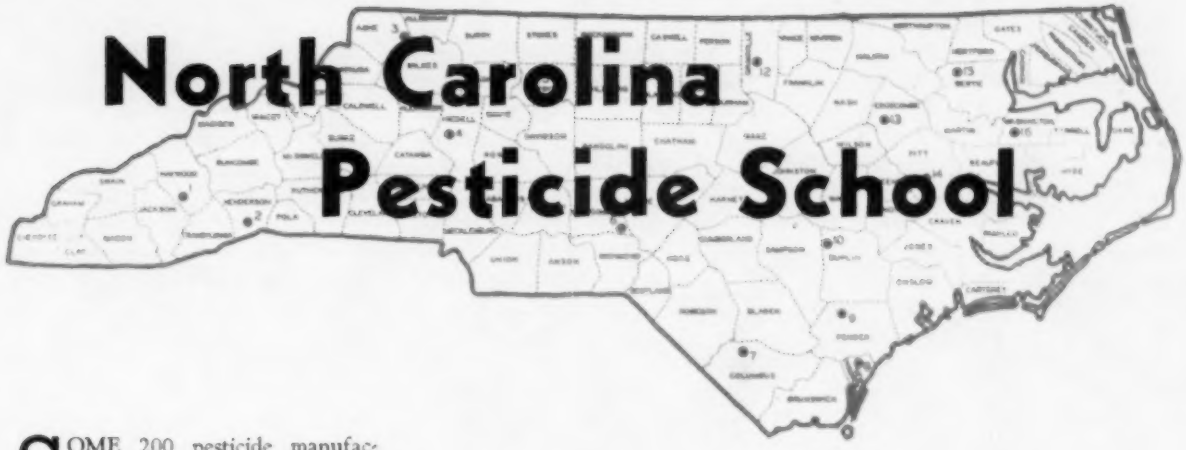
A view of the 20-story urea prill tower as construction neared completion on the Grace Chemical Company's new nitrogen plant.



A tank car is filled with anhydrous ammonia at the new Grace Chemical Company nitrogen plant located at Woodstock, near Memphis. At left is the steam boilers flue gas stack.

North Carolina Pesticide School



SOME 200 pesticide manufacturers, dealers and agricultural workers attending North Carolina State College's annual Pesticide School, January 4 and 5, at Raleigh, N. C., learned of new agricultural uses for life-saving antibiotics.

C. N. Clayton, research professor of plant pathology, told of tests which showed that an agricultural form of streptomycin is effective in controlling fireblight of apples, a condition that fosters black rot disease. While in some tests injury to foliage appeared, leaves didn't drop off and the condition cleared up in several weeks. But, warned Mr. Clayton, other experiments showed antibiotics did not control fireblight under all conditions. He said more information is needed, particularly on whether or not use of the material will contribute to the build-up of resistant strains of bacteria.

L. W. Nielsen, research associate professor of plant pathology, noted that "the antibiotic urge is upon us," in presenting a progress report on Irish potato experiments using mixtures of terramycin and streptomycin.

The material, called agrimycin, seems inadequate for use in controlling the bacterial wilt organism, but it looks promising in curtailing the monumental loss inflicted on early, Eastern North Carolina potatoes by soft rot, a post-harvest decay.

Harvested potatoes were dipped in a solution of agrimycin; in all cases where serious soft rot had developed, there was good reduction of the condition. However, at high rates of the antibiotic, another, previously unidentified fungus, developed.

W. E. Cooper, research assistant professor of plant pathology, told of experiments which indicate a partial solution to poor cotton stands that are caused by unfavorable weather conditions, such as were experienced in North Carolina last year. The use of either thiram or captan in the seed furrow improved stands considerably at the Rocky Mount Experiment Station. A big question remains, Cooper said:

Are conditions at Rocky Mount typical? Another unanswered question is whether or not the added expense of using these materials in the furrow is justified. At any rate, Mr. Cooper said, the experiments have given his organization a better understanding of factors that cause cotton stand failures.

For the second year in a row, G. C. Klingman, associate professor of agronomy, reported favorable results with controlling weeds and top-dressing corn in one operation. Work at the college has shown that a mixture of solution nitrogen, a wetting agent, and 2,4-D may serve both as a weed killer and as a fertilizer for corn. The spray mixture is applied to the base of the corn plant after it is knee-high.

R. P. Upchurch, research assistant professor of agronomy, reported on last year's testing of three chemicals used to control weeds in cotton. The materials are Karmex DL, CIPC, and DN, applied immediately after cotton is planted.

Upper Photo (L to R): D. E. Ellis, head of the plant pathology faculty; E. E. Beyer, Niagara Chemical Div., Food Machinery and Chemical Corp., Middleport, N. Y.; and R. W. Stephenson, Kirby Chem. Co., Severn, N. C.

Lower Photo (L to R): W. A. Welch, Raleigh field representative, E. I. DuPont Co.; W. G. Westmoreland, chairman, 1955 Pesticide School; and J. T. Conner, Jr., Taylor Chemical Co., Aberdeen, N.C.

Mr. Upchurch, explaining research's slowness in making absolute recommendations of such materials, said that theoretically the cotton plant grows through a film of herbicide and is not injured; weed seeds are killed as they germinate. But it doesn't always work that way. Occasionally, the cotton is killed and weeds are not. "Our problem is to weed out those uncertain chemicals," Mr. Upchurch said. "We are determined to make tests across the state to see if these materials are reliable under all conditions."

Last year's tests showed there was more injury from DN than was acceptable. Karmex DL continued to test favorably, with injury occurring in only one test, and that at a high rate of material. There was no lowering of yield by treatment.

Comparison of costs the two acceptable chemicals shows Karmex to be the most attractive. Broadcast treatment, CIPC costs $11 to $17 an acre; Karmex, $5. With a 12-inch band on 36-inch rows, CIPC runs $3.50 to $5.50 an acre; Karmex, $1.75.

High temperature had no effect on Karmex while it caused CIPC to be lost as a vapor. Karmex gave very good control of grassy and broad-leaved weeds for four to seven weeks. CIPC gave very good control of grassy weeds and good control of broad-leaved weeds for a period of three to five weeks.

Mr. Upchurch also reported the rotary hoe to be a valuable tool in weed control in cotton. It reduces hoeing time to seven hours on a conventional plot; without the rotary hoe, hand-hoeing required 14 hours.

George D. Jones, head of extension entomology, reported that North Carolina farmers received one blessing from last summer's drought. It reduced 1955's boll weevil crop. Mr. Jones said indications are that boll weevil carry-over will be the smallest in 10 years.

In some areas, where rain was normal, farmers may expect weevil population to be normal. But cotton growers of southern and southeastern North Carolina will likely reap a reward from 1954's dry weather.

Announcing changes in insect control recommendations for 1955, Mr. Jones pointed out that lead arsenate had been dropped completely from Experiment Station tobacco recommendations. The material has long been used by farmers as a bait to control budworms. Additions to recommendations are endrin for tobacco and malathion replacing parathion on vegetable crops.

L. S. Hitchner, executive secretary of the National Agricultural Chemicals Association, Washington, asserted that agitation to restrict the use of beneficial pesticides will continue until the public is sold on the idea that food with a trace of insecticide is safer than food exposed to disease-bearing insects.

Mr. Hitchner discussed the Miller Bill, which requires that manufacturers and agencies observe Food and Drug Administration tolerances in giving directions for use of pesticides. Growers, too, must follow application procedure that will keep residues below established tolerances; otherwise they risk confiscation of offending crop. Mr. Hitchner warned that registration of label does not relieve the manufacturer of responsibility, it simply protects the product. He said that if Food and Drug issues a definite tolerance for an insecticide, it would amount to an endorsement.

R. L. Rabb, Experiment Station entomologist, said tests last year ruled out row treatment with DD for control of wireworms in tobacco. He also reported that malathion gave complete control of tobacco aphids and is safer than parathion.

F. E. Guthrie, tobacco insect researcher, revealed tests which showed that worms ate twice as much of tobacco poisoned with toxaphene as of that poisoned with TDE.

George Turnipseed, research entomologist, reported that Systox gave near-perfect control of red mites in 1954 apple experiments. While research is preliminary, it appears that the material offers a residual insecticide treatment that won't have to be repeated in five or 10 years, Mr. Turnipseed said.

Others on the program were W. G. Westmoreland, extension weed control specialist, chairman; D. W. Colvard, dean of the School of Agriculture; D. E. Ellis, head of the plant pathology faculty; Clyde Smith, head of the entomology faculty; Paul Springer, USDA, Fish and Wildlife Service, Laurel, Md.; J. C. Ferguson, extension agricultural engineer; C. H. Brett, vegetable insect research; J. R. Dogger, field and forage crop entomologist; R. T. Gast, cotton insect research; W. M. Kulash, corn and stored grain research; H. R. Garriss, extension plant pathologist; C. J. Nusbaum, tobacco disease research; F. A. Todd, tobacco disease research; and N. N Winstead, vegetable disease research

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Potomac Phytophaths to Meet

The two-day meetings of the Potomac Division of the Phytopathological Society are set for March 3 and 4 at the Plant Industry Station, Beltsville, Maryland. Papers of general interest will be given in morning and afternoon sessions March 3 and a fungicide symposium, "Fungicides—Past, Present, and Future" will be held the morning of March 4. This symposium will be moderated by Dr. J. W. Heuberger and the speakers are: Dr. George L. McNew, Boyce Thompson Institute for Plant Research, who will speak on the "History and Philosophy of the Use of Fungicides;" Dr Hubert Martin, formerly of England, now Director of Science Service Laboratory, London Ontario, who will speak on the topic, "The Mode of Action of Fungicides;" Dr. T. Walter Reed, California Spray Chemical Corporation, discussing "Problems Encountered in the Commercial Production and Formulation of Fungicides;" and Mr. Lea S. Hitchner, National Agricultural Chemicals Assn. who will review "Legal and Moral Aspects Encountered in the Use of Fungicides." Mr. Hitchner will place emphasis on the recently passed Miller Bill.

The speaker for the annual banquet the evening of March 3rd will be Dr. Karl D. Butler, formerly with the United States Department of Agriculture. Dr. Butler's topic will be "The Future of Agriculture."

SPRAY OPERATORS SCHOOL

at Urbana, Illinois, Jan. 20-21

Notes Pending Control Problem

A special report to Agricultural Chemicals

Top: D. L. Klingman, second from right, answers questions about quack grass control. Seated (l. to r.) are Charles Wells, aerial applicator, Salem, Ill., Earl Taynor, aerial applicator, Champaign, Ill., Mr. Klingman, and M. B. Russell, head Univ. of Illinois Agronomy Dept. Standing is S. E. Myers, Adams County Farm Adviser. Bottom: H. B. Petty, center, extension entomologist, Univ. of Illinois College of Agriculture and Illinois Natural History Survey, answers question by Dana Stewart, Stewart Seed Co., Princeville, Ill., (on left) concerning Illinois insect predictions for 1955. The group (l. to r.) includes Stewart, E. D. Peterson, Montgomery County Farm Advisor, Mr. Petty, Jack Kemp, Kemp Spray Service, Belvidere, Ill., and John Brandenburg, Standard Oil of Indiana, Chicago.

REPORTS on new chemicals and new uses of old chemicals as well as notes of warning on pending control problems were reviewed at the Spray Operators' School on the University of Illinois campus Urbana, Ill., January 20-21. The school was staged by University agronomists and entomologists of the Illinois Natural History Survey and featured speakers from those institutions as well as the U. S. D. A. and industry.

The new herbicide, Dalapon, was mentioned often in discussions during the conference . . . other compounds discussed included maleic hydrazide, CMU, amino triazole, silvex, and the alpha-chloroacetamides. New uses were reported for TCA, IPC, CIPC, and dinitro. A certain amount of concern was expressed in reports on giant foxtail control, and spraying for elm tree insects, but a hopeful note was reported in Canada thistle control.

H. B. Petty, extension entomologist reported that with weather conditions right, corn borer infestation could be severe in all of Illinois north of Champaign. Chinch bugs and grass hoppers are a threat in several areas, but spittle bug infestations will be light or virtually non-existent in all except the area north of a line from Iriquois to Stephenson Counties.

Giant Foxtail Poses Problem

AGRONOMIST Fred Slife warned that giant foxtail could become the most serious weed pest in the state. A new species of foxtail has been discovered which produces more seed than giant foxtail and which could become a serious menace.

He listed seedbed preparation combined with delayed crop planting as the most effective control. Pre-emergence spraying has not been effective, but dinitro has shown some promise. In the two-leaf stage, which corn and giant foxtail reach at about the same time, the weed is sensitive to it, and the corn is resistant. He reports good control using from three or four pounds to the acre with no damage to the corn.

Giant foxtail in alfalfa is easier to control. Five pounds of Dalapon and ten pounds of TCA put on immediately after the first cutting will eliminate giant foxtail entirely with no damage to alfalfa.

W. O. Scott, University agronomist, reported that 2,4-D is still the most versatile and economical chemical for weeds in corn. Study has shown some promise for DNBP and CMU, but neither are recommended as yet. D. L. Klingman, USDA weed specialist, reported some new chemicals that offer promise. Among those he listed were:

1. Dalapon, which is effective against grasses such as foxtail, wild oats, quackgrass, etc. It has been

(*Continued on Page* 121)

Top photo, 1955-6 officers: R. J. Aldrich, U.S.D.A. and N. J. Agricultural Experiment Station, New Brunswick, N. J., secretary; J. D. Van Geluwe, G.L.F., Ithaca, N. Y., president; L. L. Danielson, Virginia Truck Experiment Station, Norfolk, vice president; and D A. Schallock, Rutgers University, New Brunswick, treasurer.

Top right: Marvin Schreiber, Cornell University, Ithaca, N. Y. is shown being presented with $100 and certificate by R. H. Beatty (left), chairman of Awards Committee.

Photo right bottom: Robert Beatty, American Chemical Paint Co., Ambler, Pa.; and Marion Parker, (at right) U.S.D.A. Weed Investigation section, discuss the proposed "Weed Society of America."

NORTHEASTERN *Weed Control Conference*

reviews new and past developments... discusses "Weed Society of America"

TECHNICAL and practical discussions on the use, action and application of herbicides were co-featured at the ninth annual meeting of the Northeastern Weed Control Conference held January 5-7th at the Hotel New Yorker, New York City . . . at which time northeastern members were also brought up to date on plans for organizing the Weed Society of America.

Robert H. Beatty, American Chemical Paint Co., and president of the Association of Regional Weed Control Conferences presented to more than 500 members and guests attending the northeastern conference an account of the December, 1954 meeting of the Association in Fargo, N. D. and outlined plans for organization of the Society. Mr. Beatty reported that a temporary constitution has been adopted which will be used until the time of the charter meeting of the newly formed Society in New York City, January 4-6, 1956.

The officers of and delegates to the Association of Regional Weed Control Conferences are to serve as the executive committee of the Society until election of officers in 1956. Officers reappointed to serve during the reorganizational period are: R. H. Beatty, president; W. B. Ennis, Jr., vice president; and W. C. Shaw, secretary-treasurer.

1955 Officers Elected

AN election of officers for 1955 of the Northeastern Regional Group resulted in unanimous vote for J. D. Van Geluwe, G. L. F. Soil Building Service, Ithaca, N. Y., as president; L. L. Danielson, Virginia Truck Experiment Station, as vice president; R. J. Aldrich, USDA, Field Crops Research Branch as secretary; and D. A. Shallock, Rutgers University, New Brunswick, N. J., as treasurer.

Honored for outstanding contribution in the field of weed control, M. M. Schreiber, Cornell Univ., Ithaca, received the "best paper award" for his report on "Comparison of MCP and 2,4-D for Weed Control in Forage Legumes."

New Chemicals Reviewed

IN a report on "Promising New Chemicals," R. J. Aldrich, USDA and N. J. Agricultural Experiment Station, New Brunswick, discussed nine new chemicals which show promise for use in certain areas. This review is summarized below:

Dalapon (sodium salt of 2,2-dichloropropionic acid) for pasture renovation, perennial grasses, bedstraw.

Amino triazole (3-amino-1,2,4-triazole) for pasture renovation, perennial weeds, and redroot in cranberries.

3,4-dichloro phenoxyacetic acid for control in alfalfa.

2,3,6-trichloro benzoic acid and its sodium salt. Pre-emergence control in corn.

Sodium 2,4,5-trichloro phenoxyethyl sulfate and related compounds for control in tomatoes.

3-(3-4,dichlorophenyl)-1, 1-dimethylurea. Certain advantages in longer weed

control and greater safety to vegetables in some instances than CMU.

2,4,5-trichloro phenoxypropionic acid. Pre-emergence control in corn.

2-chloroethyl N-(3-chlorophenyl)carbamate and 2-(1-chloropropyl)N-(3-chlorophenyl)-carbamate.

Disodium methyl arsenate for crabgrass control.

Results of greenhouse screening of experimental arsenicals as contact herbicides and as soils sterilants as presented by C. R. Skogley and G. H. Ahlgren, Rutgers University, New Brunswick, N. J., indicated that cacodylic acid has phytotoxic properties over and above those generally attributed to arsenic toxicity, warranting further investigation.

Use of Dalapon and Natrin

THE "Experimental Use of Dalapon and Natrin on Certain Transplanted Vegetable Crops" was reviewed by L. L. Danielson and M. H. Schumacher, Virginia Truck Experiment Station, Norfolk, Va. and showed that Dalapon applied in weed killing concentrations in spray form on foliage sweet potatoes at lay-by time is extremely injurious, as reflected by yields . . . Alanap 2 used as a standard for comparison did not reduce yield or vigor.

A general conclusion of the tests reported states Dalapon and Natrin at weed killing rates are both so toxic to young tomato transplants that they do not appear to have any possibility of practical use at this stage of growth.

R. M. Menges and R. J. Aldrich, N. J. Agricultural Experiment Station, New Brunswick, reporting on the response of tomatoes to Natrin and derivatives advise that Natrin and E.H. 7977 at 2½ and 5 pounds per acre effectively control both broadleaf and grass weeds, and that comparable rates of E.H. 6831 are somewhat less effective. They indicate also that different levels of irrigation do not affect weed control.

R. J. Zedler, Carbide & Carbon Chemicals Co., N. Y., suggests that Natrin can be used successfully to control weeds in tomatoes at rates of 2 to 4 pounds per acre. He cautions, however that occasional crop injury has been encountered when dosages above four pounds have been applied immediately after transplanting.

An overall review of herbicides for tomatoes by R. D. Sweet, G. Crabtree and C. Benedict, Cornell University, Ithaca, N. Y., indicated that when both plant response and weed control are considered, Natrin is outstanding among the herbicides currently in use. Other materials showing promise include 7976, 7977 and several Karmex compounds.

Herbicides for Onions

M. J. Papai, W. Baran and E. R. Marshall, GLF Soil Building Service, Ithaca, N. Y., reporting on small plot trials of herbicides on muck grown onions in New York State advised that the three urea herbicides, CMU, PDU and DMU all give good weed control with no onion injury when applied pre-emergence. Hydrin gives good initial weed control but lacks residual control and injures onions somewhat. TCP gives excellent weed control at 2 lbs. per acre but produces epinasty and severe onion injury.

The best treatments for chemical weeding of set onions, based on tests reported by C. J. Noll and M. L. Odland, Pennsylvania State University, State College, Pa., are Chloro IPC at 4 lbs. per acre and KOCN at 16 lbs. in 100 gals. per acre applied in a post-emergence application. Chloro IPC at 4 lbs. in a pre-emergence application followed by KOCN in a post-emergence application gives equally good yield with better weed control than KOCN alone.

In a series of tests where CMU, CIPC and KOCN were used at various rates both pre and post emergence and as both overall and direct sprays for weed control in seeded Sweet Spanish Onions, the most satisfactory pre-emergence treatments were ⅓ lb./acre of CMU or 3 lbs. CIPC . . . according to a paper prepared by S. L. Dallyn, R. L. Sawyer, T. H. Haliburton and R. D. Seif, Long Island Vegetable Research Farm, Riverhead, N. Y. The report states also that the most promising post emergence treatments applied 6-8 weeks before harvest are directed sprays of either CMU or CIPC. CIPC is probably the safer material to use and CMU is not recommended except in the case of a severe grass problem.

W. Ferguson and J. J. Jasmin, Central Experimental Farm, Ottawa, Canada, continued the discussion of chemical weed control in onion, squash and tomatoes and reported that under conditions prevailing in Eastern Canada in 1954, Alanap-1 at 2 pounds per acre was insufficient to control weeds in squash and pumpkin and that Sesin at 8 pounds per acre was more effective in controlling weeds in tomatoes than Natrin at 5 pounds per acre.

Weed Control in Potatoes

THE chemical DNOSBP has proved satisfactory for pre emergence control of many annual weeds in potatoes, conferees were told by R. J. Aldrich and J. C. Campbell of the N. J. Agricultural Experiment

J. D. Van Geluwe, G.L.F., Ithaca, N.Y., newly elected president, is surrounded by past presidents of the organization. Sitting left to right are A. O. Kuhn, retiring president, J. Van Geluwe, and R. H. Beatty. Standing left to right are: G. H. Ahlgren, R. D. Sweet and S. M. Raleigh.

Station. They reminded, however, that a possible limitation to the use of this compound is its relatively short period of control, which ordinarily ranges from 4 to 8 weeks.

CMU and Sesin applied after the last cultivation show promise for control of late germinating weeds, according to Drs. Aldrich and Campbell. They suggested also that a combination of Dalapon and 2,4-D may prove effective in control of late germinating weeds and warrants further investigation. It is cautioned that rates of application of CMU in excess of one pound per acre pre emergence and ½ pound per acre post emergence reduce vine growth and yield.

Weed Control in Corn

RESULTS of tests where thirty two different herbicides or combination of herbicides were applied at two times of application to field corn discussed by E. R. Marshall, GLF Soil Building Service, Ithaca, N. Y., indicated that the most outstanding material of the growth regulator type was TCB. Other materials showing promise were 2,4-D amide, AT-2,4,5-T and LV4. The carbamates T-595, T-596 and CIPC at the rates used did not give satisfactory weed control. A ranking system shows that the most effective materials tested in order of control are Sinox PE, TCB, CMU, PDU, LV4, AT-PCP and PCP. Combinations of LV4 SES, LV4 Sesin, and LV4 Natrin gave no better weed control than several of the other materials tested.

C. Veatch, W. Virginia Agricultural Experiment Station, reported that tests on cultivated plots showed higher yield than plots which were not cultivated; furthermore, that in several cases chemical treatments actually resulted in lower yields than where no attempt was made to control the weeds. He said also that pre-emergence and post-emergence treatments gave better weed control than comparable emergence treatments.

Excellent general control of weeds in field corn is obtained with pre emergence applications of a low volatile ester of 2,4-D or dinitro for at least 4 weeks according to J. Vangris, University of Massachusetts, Amherst, Mass. He also indicated that post emergence DN applications are slightly better than pre-emergence sprays. When herbicides are applied at "laying by" time, the most effective chemicals for controlling small seedlings of weedy grasses in field corn are Dalapon and amino-triazole.

In a report on "Preemergence Weeding of Sweet Corn," W. H. Lachman, Massachusetts Agricultural Experiment Station indicated that NaPCP, Karmex W, Karmex DW, DN (Premerge), Kuron, Dow Form 40, Esteron 10-10, and TCB, effectively control weeds; however, that Amizol at the one pound rate is ineffective.

Alfalfa, Beets, Legumes

ALFALFA growth is not affected and yields are not reduced by ¼ and ½ pound applications of 3,4-D according to R. J. Aldrich, New Brunswick. Alfalfa is also tolerant to 4-chloro applications, although yield is significantly reduced by ½ pound per acre. Red clover is tolerant of ¼ and ½ pounds of MCP.

A. C. Kuhn, W. E. Garvey, T. H. Schutte and M. Milcox, University of Maryland Agricultural Experiment Station, reported that pulverized calcium cyanamide, CIPC, and the combination of CIPC and MCP reduced weed competition for about two months in herbicide applications at the time of seeding between the rows of alfalfa. This reduction in weed competition, however, did not result in increased alfalfa plant stands by the time of the first harvest of alfalfa the next spring.

According to a report by J. Vengris, University of Massachusetts, Dalapon at rates of 3 lb./acre is effective in eliminating downy chess on established alfalfa sods; CIPC 4 lb./A and 8 lb./A decreases weeds in alfalfa hay seed significantly but does not eliminate them. Endothal is not effective.

C. J. Noll and M. J. Odland, Pennsylvania State University report that the most promising treatment for the weeding of beets is Endothal applied in a pre-emergence application, when there is sufficient moisture in the soil to encourage weed germination. Endothal applied in a pre-emergence application on dry soil has no effect on weed control or on stand or yield of beets.

In a report on "Chemical Weed Control in New Grass-Legume Seedlings," J. Vengris and W. G. Colby, University of Massachusetts indicated that chickweed is effectively and significantly controlled only by dinitro treatments.. 2,4-D was shown to be more effective in controlling dicot weeds than 3,4-D.

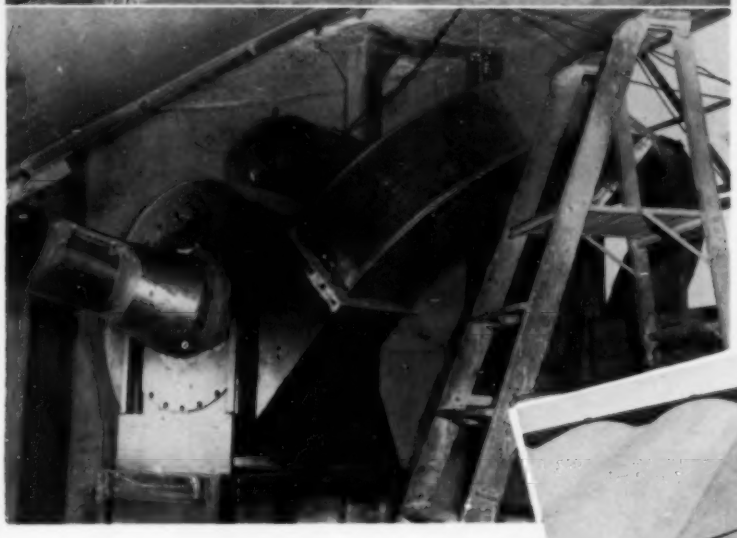
Herbicide Application Equipment

A SPECIAL session on equipment factors affecting use and application of weed control chemicals attracted more than 200 conferees at the 3-day meeting. L. E. Creasy and C. E. Wilson, Jr., of the Grasselli Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del. discussed equipment factors affecting the application of wettable powder formulations of substituted urea herbicides and reviewed such considerations as the mechanics and problems of agitation, screen sizes, sedimentation, foaming, oil suspensions, etc. They reminded the group that sediment is an important consideration with conventional booms, as used for blanket rather than band applications.

A graph plotting flow against inside tube diameter may be used as a guide in determining boom diameter to minimize sedimentation difficulties.

In an analysis of the boom versus the boomless sprayer, R. E. Patterson, S. M. Raliegh and P. M. Anderson, Pennsylvania State University, State College, Pa., report that the boom sprayer gives very good control under practically all circumstances because of very uniform coverage, although it may be a little inconvenient to mount and operate because of the long boom. The boomless sprayer will give satisfactory control in most cases where translocative or volatile sprays are used as long as wind is not a contending factor. It is simple to mount and easier to operate around fences. With a sprayer, the same as other equipment when used within

(*Continued on Page* 127)



GRAIN FUMIGATION

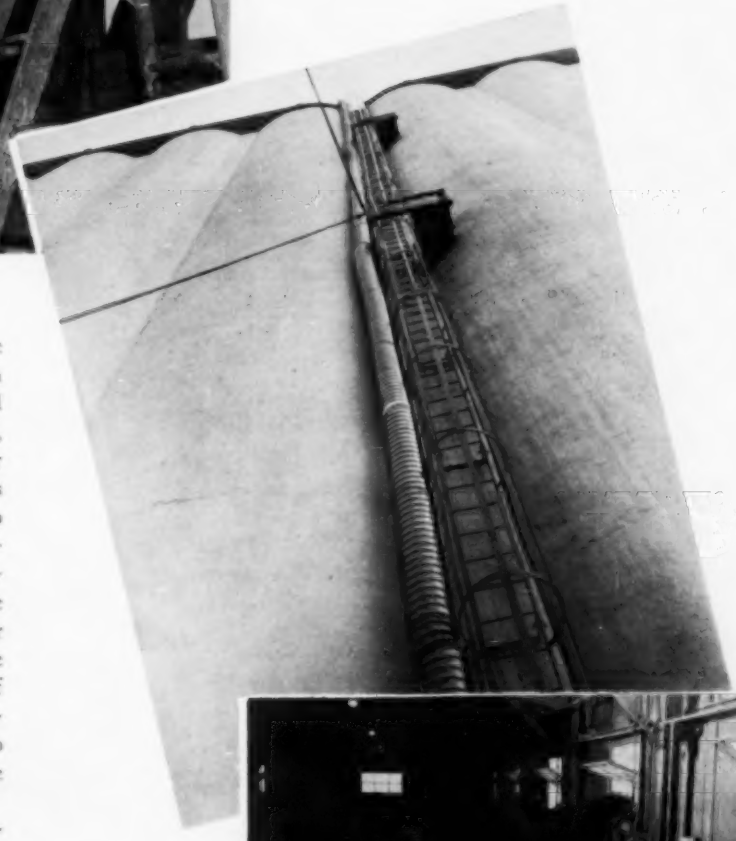
By G. L. Phillips
Manhattan, Kansas

Top Left: Figure 6.—Ten-inch pipe perforated with 1463 one-half inch holes enclosed in 10-mesh screen, which was placed in the hopper as an air pickup source.

Bottom Left: Figure 7.—Blower attached to end of perforated pipe.

Center: Figure 8.—Flexible tubing used as a return duct to the top of the elevator tank.

Bottom: Figure 9.—Final section of the return duct in the head house. The damper is located just before the elbow. Note the sampling tubes leading through the manhole cover.



PART II

AT the Danville plant of the Lauhoff Grain Company an elevator tank was selected that had a ladder up the outside wall, which could be used as an anchor for the return duct of the system. This tank was one of a group of 18 silo tanks and 25 interstice bins that constituted one wing of the Danville elevator. It was 125′3″ with an inside diameter of 24′ and a conical hopper extending 10 feet downward at the lower end, and had a capacity of 58,170 cubic feet. The top was provided with two manholes opening into the head house, and air vents into the next tank on each side.

The recirculation system consisted of a perforated pipe placed across the hopper, a blower, a return duct up the outside of the elevator and a damper to regulate the rate of air flow. The perforated pipe was 10 inches in diameter (Figure 6) and ex-

tended about 12 feet across the hopper at a point halfway between the base and the tip. It contained 1463 one-half inch holes. When placed in position, a 10-mesh screen was wrapped around it to prevent grain from entering the perforations. A 30-inch blower was connected directly to the 10-inch perforated pipe (Figure 7), driven by a 10 H. P. electric motor. A metal adapter led through a convenient window to the outside. The portion of the return duct from the blower to the top of the elevator was composed of flexible 12-inch tubing fastened at 6 to 8 foot intervals to the ladder (Figure 8). This tubing was in 25-foot lengths, joined by ring couplings which were taped with masking tape to insure their tightness. Another metal section was used in the head house, which contained a damper to regulate the air flow. This section terminated in a collar fitted to the seal in one of the manholes opening into the tank. (Figure 9).

The gas sampling system was composed of lengths of ¼-inch plastic tubing taped together into cables. Each set contained three tubes which were placed at selected positions at various levels in the tank. The tubes were put in place by an operator lowered into the elevator as each desired grain level was reached. A winch rigged with a steel cable and a bos'n chair was used to lower the operator.

The gas concentrations were determined by the same thermal conductivity gas analyzer used in the tests in ships holds.

Procedure

THE elevator was loaded with 48,554 bushels of sample grade shelled corn with a moisture content of 12.8 per cent. As the selected levels for the gas sampling tubes were reached, the filling was stopped and an operator lowered into the tank to place the tubes. Sampling tubes were placed at the 15, 35, 55, 75, 95, and 115 foot levels. The tubes at each level were placed at the center and near the north wall, and the third near the east wall in alternate levels from the lowest, and near the west wall in the others. One sampling tube was placed above the load, and one in the hopper. A head space of about five feet was left in the top of the tank. The air vents and the manholes were sealed after the tank was filled.

It was desired in this and other tests to follow, to study the gas distribution from various rates of air flow. Therefore, the capacity of the blower in this temporary installation was varied by increasing the speed to get a miximum flow, and by closing the return duct by one half with a damper, to reduce the flow rate materially. In the first test at 1268 rpm and the damper wide open, a flow of 1192 cfm resulted (=0.245 cfm/bushel). In the second, the damper was closed halfway and a flow of

(*Turn to Page* 133)

TABLE 7

Distribution of methyl bromide in an elevator tank of shelled corn resulting from recirculation for 75 minutes with an air flow rate of 0.0245 c.f.m./bushel, and disappearance of gas resulting from forced aeration for 3 hours. Dosage 12.8 ounces/1000 cu. ft.

Sample number	Location	Concentration during fumigation (ounces/1000 cu. ft.)						Concentration during aeration (ounces/1000 cu. ft.)				
		min. 30	hour 1	hours 2	hours 4	hours 8	hours 24	min. 30	hour 1	hours 2	hours 4	hours 16
1	Space above load	4	7	0	0	0	0	0	0	0	0	0
2	15′ deep, north wall	6	8	6	4	3	2	0	0	0	0	0
3	center	7	7	6	4	3	2	0	1	0	0	0
4	east wall	9	8	6	4	3	2	1	1	0	0	0
5	35′ deep, north wall	10	8	6	4	3	2	0	1	0	0	0
6	center	8	6	6	4	3	2	1	T	0	0	0
7	west wall	10	6	6	4	3	2	1	1	0	0	0
8	55′ deep, north wall	7	7	6	4	3	2	1	1	0	0	0
9	center	6	6	6	4	3	2	0	0	T	0	0
10	east wall	6	7	7	4	3	2	1	1	1	0	0
11	75′ deep, north wall	6	6	6	4	2	2	2	1	0	0	0
12	center	7	8	6	4	4	2	0	0	0	0	0
13	west wall	8	7	7	4	3	2	1	T	0	0	0
14	95′ deep, north wall	4	4	3	3	2	2	0	0	1	0	0
15	center	7	7	7	4	3	2	1	0	0	0	0
16	east wall	7	6	7	4	3	2	1	0	0	0	0
17	115′ deep, north wall	0	2	2	2	2	2	0	0	T	0	0
18	center	7	7	7	4	3	2	0	0	0	0	0
19	west wall	0	2	2	2	2	2	1	0	T	0	0
20	Hopper	6	6	6	4	3	2	1	0	0	0	0

TABLE 8

Distribution of methyl bromide in an elevator tank of shelled corn resulting from recirculation for 85 minutes with an air flow rate of 0.0201 c.f.m./bushel, and disappearance of gas resulting from forced aeration for 3 hours. Dosage 12.8 ounces/1000 cu. ft.

Sample number	Location	Concentration during fumigation (ounces/1000 cu. ft.)						Concentration during aeration (ounces/1000 cu. ft.)				
		min. 30	hour 1	hours 2	hours 4	hours 8	hours 24	min. 30	hour 1	hours 2	hours 4	hours 22
1	Space above load	14	10	0	0	0	0	0	0	0	0	0
2	15′ deep, north wall	14	9	7	5	3	3	T	T	0	0	0
3	center	12	8	7	6	4	3	1	T	0	0	0
4	east wall	18	8	8	6	4	2	1	0	T	0	0
5	35′ deep, north wall	11	8	8	5	4	3	T	0	T	0	T
6	center	12	8	7	5	4	3	T	0	0	0	0
7	west wall	10	9	8	6	4	3	1	T	T	0	T
8	55′ deep, north wall	10	8	8	6	4	3	1	0	0	0	0
9	center	8	8	7	5	4	3	1	T	T	0	T
10	east wall	9	8	7	5	4	3	T	T	T	0	T
11	75′ deep, north wall	2	6	5	4	3	3	0	2	1	0	T
12	center	5	8	7	6	4	3	0	1	T	0	0
13	west wall	3	7	6	5	3	2	0	T	T	0	0
14	95′ deep, north wall	0	0	3	2	1	T	1	0	T	0	0
15	center	6	10	6	6	5	3	1	0	0	0	T
16	east wall	4	8	6	4	3	2	T	0	1	0	T
17	115′ deep, north wall	1	0	1	2	0	T	0	0	0	0	T
18	center	6	10	6	6	5	3	0	0	0	0	1
19	west wall	1	2	2	2	1	2	0	0	0	0	0
20	Hopper	4	7	6	5	2	T	2	0	0	0	0

TABLE 9

Distribution of methyl bromide in an elevator tank of shelled corn resulting from recirculation for 75 minutes with an air flow rate of 0.0317 c.f.m./bushel, and disappearance of gas resulting from forced aeration for 2½ hours. Dosage 12.8 ounces/1000 cu. ft.

Sample number	Location	Concentration during fumigation (ounces/1000 cu. ft.)						Concentration during aeration (ounces/1000 cu. ft.)				
		30 min.	1 hour	2 hours	4 hours	8 hours	24 hours	min. 30	hour 1	hours 2	hours 4	hours 22
1	Space above load	12	6	2	T	0	0	0	0	0	0	0
2	15′ deep, north wall	12	10	6	5	4	3	1	0	0	0	0
3	center	14	8	7	6	4	3	T	0	0	0	0
4	east wall	12	8	7	6	4	3	1	0	0	0	0
5	35′ deep, north wall	12	8	6	6	4	3	1	0	0	0	0
6	center	11	8	7	6	4	3	1	0	0	0	0
7	west wall	10	10	7	6	4	3	1	0	0	0	0
8	55′ deep, north wall	10	9	7	5	4	3	1	0	T	0	0
9	center	12	10	8	6	4	3	1	0	0	0	0
10	east wall	10	8	7	5	4	3	T	0	0	0	0
11	75′ deep, north wall	3	6	6	4	4	3	3	1	T	0	0
12	center	8	10	8	6	4	3	1	T	0	0	T
13	west wall	5	10	8	6	4	3	1	T	T	0	0
14	95′ deep, north wall	2	3	2	3	1	2	2	1	T	0	0
15	center	8	10	9	6	4	3	2	T	T	0	0
16	east wall	6	9	8	6	4	3	2	T	0	0	0
17	115′ deep, north wall	0	0	1	2	2	1	T	0	0	0	0
18	center	10	11	9	5	4	3	1	T	T	0	0
19	west wall	1	2	1	2	1	2	2	0	T	0	0
20	Hopper	7	6	7	5	4	3	2	1	T	0	0

Use of Growth Regulators on Trees

By David G. White*

Visiting Professor** of Horticulture
Rutgers University
New Brunswick, N. J.

MANY orchardists use sprays of growth regulators to thin heavy sets of peaches and apples in the spring and again in the fall to prevent excessive pre-harvest drop of apples. Sometimes their results are most successful, at other times they are only partially successful; again there may be no effect, or there may be adverse effects. Similarly, results of studies at the various Experiment Stations show considerable variation. Some of the materials being used as sprays are naphthaleneacetic acid, naphthaleneacetamide, 2, 4, 5-trichlorophenoxypropionic acid, and 3-chloro-isopropyl-N-phenyl carbamate.

The applications of growth regulators are of such economic importance that fruit growers are using them even before research workers have obtained reasonably consistent results. For example, experimenters have not yet figured a systematic way to inter-relate the various factors that influence the results in order to predict safely what will happen following application of a growth regulator. This report is not an apology for the lack of information by research workers, but it will serve to explain the complexity of attempting to predict results and to make recommendations for the use of growth regulators. Unfortunately it does not seem that after next year, or perhaps several years, we will know all the answers necessary to predict the results of sprays of growth regulators on fruit trees.

A plant growth regulator may be defined as an organic compound, other than a nutrient, which in a small amount promotes, inhibits, or otherwise modifies any physiological process in a plant. Four important physiological processes are: (1) *photosynthesis*, a process by which carbon dioxide of the atmosphere and water within the leaves are made into carbohydrates; (2) *respiration*, the process in which carbohydrates are broken down into carbon dioxide and water; (3) *translocation*, the process involving the movement of nutrients and food materials within a plant; and (4) *transpiration*, the process in which water vapor is lost from a plant. No doubt other physiological processes are also affected by growth regulators, but consideration of only the above four is sufficient to complicate the prediction as to how a fruit tree will respond to their application.

In order to understand the effects of a growth regulator on the various physiological processes it is necessary to consider some other factors which affect the same physiological processes. As a matter of fact, it is these other factors which often seem to be the main source of complexity in the prediction of the effects of a growth regulator. For example, we know that each of the physiological processes mentioned is affected by:

Temperatures. Within reason the rate of a process slows down at cool temperatures and increases at warm temperatures. We also know that occasionally plants respond to a growth regulator according to the temperatures prior to, during, and following application. Unfortunately, the outside temperatures, or total heat

*Prepared from an address presented December 7, 1954 to the New Jersey State Horticultural Society.

**On sabbatical leave from The Pennsylvania State University.

units, for several days following treatment cannot be predicted with certainty.

Light intensity and duration. These radiation factors particularly affect photosynthesis and transpiration. In general, these processes occur at higher rates under high light intensity of long duration than they do under opposite conditions. In addition, with some plants at least, the amount of radiation is associated with variations within the plant of naturally occurring growth regulators (auxins) which may affect the results of those which are applied externally as a spray.

Humidity. The amount of water vapor in the atmosphere affects the rate of transpiration in particular, and it also may influence the rates of photosynthesis, respiration, and probably other physiological processes. As with other climatological factors, the humidity of the atmosphere for several days following the application of a growth regulator cannot be predicted accurately. Since growth regulators affect the various physiological processes within any plant, we cannot separate their effects from those of the climate.

The effects of a growth regulator are associated with the chemistry and physics of the chemical itself. Some of the variations possible in this category are as follows:

Chemical differences. The various compounds used as growth regulators differ in their composition and structure. These basic differences, for example, often define whether the compound is used as a thinning spray, as a herbicide, or as a root promoting substance, etc.

Concentration. The amount of the growth regulator in a certain volume of solution is related usually to the degree of plant response. Too high a concentration often results in injury, and too low a concentration may result in no effect.

Amount of the chemical absorbed. Precisely how much of the active chemical is absorbed by each tree may be considered as important as the concentration of the solution. Ordinarily, a certain concentration of the growth regulator is sprayed onto the tree without any consideration of the actual total amount absorbed by the tree. The methods of application possibly can be modified in order to control this factor.

Method of application. Orchardists ordinarily apply sprays as dilute solutions under high pressure, or as dilute or concentrated solutions by means of an air blast, by airplane, or by helicopter. In some instances, the trees may respond differently according to the method used for applying the spray.

Evenness of spray coverage. Variations of this physical factor can cause different responses, and occasionally there may be reason to desire a difference in coverage. For example, the upper parts of apple trees apparently require more thorough coverage by a growth regulator spray to thin the fruit than the lower and inner parts. An even coverage sometimes underthins the top parts and over-thins the lower and inner parts.

Number of applications. More than one application of some growth regulators are used on trees in a single season and, therefore, the results may vary accordingly.

Accessory materials. The results from the use of a growth regulator may be affected by associated chemicals such as: wetting and spreading agents, emulsifying agents, stickers or other adhesive agents, and carriers or diluents involved in the formulation of the preparation. A change in one or more of these accessory materials may account for differences in results.

Other spray materials. Little is known as to whether the customary pesticides used on fruit trees affect the results of growth regulators. There may be chemical reactions among them, but few, if any, studies have been reported.

The results from a growth regulator spray also may be affected by the status of the plant itself, including such variables as:

Vigor. Differences among trees associated with their age, cultural treatments, climatic variations, the size of the previous season's crop, and variations of vigor within a single tree may account for different results from growth regulator sprays.

Variety differences. It is a well-known fact that some varieties of peaches and apples are more or less responsive to growth regulator treatments than other varieties.

Bloom intensity. The actual number of blossoms on a tree and the percentage of them which were fertilized by pollen will influence the percentage of natural drop and will complicate the results of a thinning spray in particular.

The pollen parent. English investigators believe that the endosperm tissue of the seeds is affected by growth regulators used for thinning and cause the fruit to drop. If this is true, then the pollen parent may be of importance because endosperm tissue contains one set of chromosomes furnished by the pollen. It is conceivable, therefore, that the degree of thinning brought about by a chemical regulator might be influenced one way or the other by the pollen parent which caused the fruit to set.

Accumulative effects. Although a small amount of experimental data suggests that there are no carry-over effects of growth regulator sprays from one season to the next, this possibility exists and occasionally has been noted. It is possible that with continued applications of growth regulators over a period of several years there might be an accumulated amount present in the plant from the previous applications that would influence results of the current season's spray.

The stage of fruit development. The stage of fruit development at the time of spraying seems to be closely associated with the results. Most recommendations and suggestions for using growth regulators on fruits are based upon the period of days after full bloom or before predicted harvest. Since fruits rarely develop at the same rate during the early spring of one year as in other years, and to some extent vary in their development during the last few weeks before maturity, recommendations based upon a particular number of days probably are unreliable. In order for the time

(*Continued on Page* 135)

A. J. Walz elected chairman for 1956, as entomologists meet in Portland, Ore. for 14th annual conference of the

Pacific Northwest

By Charles Starker

ENTOMOLOGISTS from seven western states and provinces met January 17, 18, 19 at the Imperial Hotel, Portland, Oregon, for the 14th annual Northwest Vegetable Insect Conference. Co-chairman A. J. Walz of the Parma, Idaho branch Experiment Station stated that the reports given should be considered as progress reports and not as conference recommendations.

Onions and Crucifers

DR. Angus Howitt, Western Washington Experiment Station, Puyallup, Wn. summarized reports on pests of onions and crucifers and reviewed the very erratic results on onion maggot. British Columbia workers found both lindane and dieldrin helpful, but maggot populations were low. Slurry treatments with lindane resulted in considerable phytotoxicity. Furrow drenches of chlordane in Oregon failed to give control, so heptachlor was used. Three applications of heptachlor failed to give satisfactory results. Grower applications of malathion in bait sprays, and later as dusts, were made from mid-May to August and while quite expensive, apparently saved the crop in that area. Washington work showed isodrin to be best in their tests. In Idaho, heptachlor as a dust and wettable powder was most effective, while Utah workers used aldrin, heptachlor and lindane in the row and found them all good.

Turnip maggot tests were a little more in agreement and work reported was from a number of coordinated experiments in several areas. Soil application of insecticides gave best results, and heptachlor and aldrin at two to three pounds technical per acre were superior to other materials used. Canadian workers found aldrin and heptachlor at two pounds effective, but aldrin at twice that rate did not improve control. Oregon workers had favorable results with aldrin and chlordane. In both Oregon and Washington, aldrin and heptachlor were used against maggots on rutabagas and turnips, with heptachlor giving slightly better control. In Idaho, aldrin dust was better than chlordane applied to the furrow. In all cases, furrow treatments were better than drenches.

Soil Pests

C. NEILSON, British Columbia Department of Agriculture, Vernon, B. C., reported on work done on soil pests. Symphylids were actively studied in both Oregon and Washington. Oregon work with both aldrin and heptachlor has proved largely unsatisfactory, and workers there feel that there are other factors involved, such as cultivation and moisture relationships, which have made the use of chlorinated materials erratic and undependable. Flavor evaluation work with the Oregon Department of Food Technology has been continued. Results with aldrin indicate five pounds is the maximum allowable on peppermint. Aldrin, dieldrin and heptachlor, all at rates of ten pounds technical per acre, have not given significant flavor differences on the most important vegetable and small fruit commodities produced in Oregon.

Wireworm control methods are still under active study at the federal laboratory in Walla Walla. Aldrin, dieldrin, heptachlor, chlordane and DDT were studied, and of these, heptachlor gave the best results. Soil from treated field plots was removed at intervals of two weeks and six months after an application of four pounds of technical heptachlor per acre, and killed 100% of the wireworms exposed to it in laboratory tests. Applications of heptachlor at two pounds per acre tested in the same way, killed 93% and 73% of wireworms at the two week and six month interval samplings. Aldrin and dieldrin were less toxic than heptachlor. Chlordane at eight pounds, and DDT at twenty pounds per acre, were also less toxic than heptachlor at the four pound rate. Granular forms of heptachlor were less effective than dusts against wireworms in the soil. DDT apparently has the longest residual action of the materials tested. Treatment of seed with chlorinated insecticides was also investigated, and the efficiency of materials used for this purpose apparently is correlated with their ability to diffuse in the soil. Lindane showed best in their tests, with aldrin and heptachlor next, followed by chlordane and DDT.

Utah workers tried the same group of chemicals on both soil and seed treatments—using aldrin, dieldrin, heptachlor and lindane on corn, snap beans, limas, Hubbard squash and radish. Chemicals were applied at one-half ounce per 100 lbs. seed, or at one-half pound per acre, to the soil in the row at planting time. No insect infestations developed, but the tests did give them an opportunity to check phytotoxic effects on crop plants studied. The

Vegetable Insect Conference

effect on germination varied with the seed. Certain materials would adversely affect one plant, but not another. Idaho investigators tried a combination fungicide-insecticide application in slurry form to beans and corn. A cellulose sticker was used with the slurry. Aldrin, dieldrin, heptachlor and lindane were used at one ounce per 100 lbs. seed, both with and without a fungicide. Aldrin was the only material used which did not reduce the stand on limas below that of the check when insecticides were used alone. These same materials were also tried on corn, but none of them when used alone reduced the stand below that of the check. Storage tests after treatment showed that storage periods of 12 to 18 months had not reduced germination, and that it was probably safe to store treated seed for some time before planting.

Potatoes Test Reported

ED Klostermeyer, Irrigation Experiment Station, Prosser, Wn., reported on potato pests. The potato flea beetle and the green peach aphid are the two worst pests. The flea beetle is still a problem in Oregon, Washington and British Columbia. Foliar applications of insecticides apparently are now a thing of the past, as soil applications before planting have given excellent control using aldrin, heptachlor or dieldrin. Rates used per acre vary, with British Columbia workers using slightly higher amounts than those in Oregon.

The green peach aphid is a problem in Washington and Idaho. Parathion has not been too successful in Washington. Field tests comparing air application of this material with ground sprayers, showed the air application to give poorer results. While ground equipment gave fair results, aphids are apparently becoming resistant to parathion in the Union Gap area.

Beets, Lettuce, Beans and Sweet Corn

R. W. Every, Extension Entomologist, Oregon Experiment Station, reported on pests of these crops. Utah workers using DDT on sugar beets found two applications did not give any significant increase in yield over the check. Increases had been obtained in other years, but Lygus populations this year were quite low. Idaho work on lettuce aphids, using a fairly large number of phosphate materials, showed all giving excellent initial kills. Systox, Schradan, diazinon and compound No. 2046 gave longer residual kills than the others. California reports on tests aganist spider mites on lima beans indicated sulfur to be quite specific—with no control on two-spotted mites, but up to 85% control on some other species. On two-spotted mites demeton and aramite proved best.

Field studies on the nitidulid beetle on pole beans in Oregon showed that six beetles or more per blossom could cause blossom drop, and damage was worst on varieties with but one bloom flush. Four per cent malathion dust at 40 lbs. per acre gave no flavor alteration, even when beans were picked 24 hrs. after the application and then canned. Residues of 2 ppm were found on beans picked the same day they were treated. Utah work against the *Drosophila* fly, showed aldrin and dieldrin to be effective.

Attempted control of corn earworm by air application of dust and spray formulations was ineffective. In ground applications of DDT and malathion, 10% malathion compared favorably with 5% DDT dust.

A 15% metaldehyde dust used against slugs on pole beans and young corn appeared much more promising than the standard "slug baits" currently in use in western Washington.

Small Fruit Studies

R. G. Rosenstiel, Oregon State College, summarized the reports given in this section. Cyclamen mites are a real pest on strawberries in California. In a three year study, three materials of 50 under investigation showed some promise. They were endrin, azobenzine and isodrin. When used on a commercial scale they were not effective. At the present time, some California growers are using a 2 percent parathion dust at

(*Continued on Page* 125)

1955 officers of NWVIC: David H. Brannon, Pullman, Wn. secretary; A. J. Walz, Parma, Idaho co-chairman and H. H. Crowell, Corvallis, Ore., chairman.

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The Pink Bollworm Menace

By Dr. F. C. Bishopp*
Oscar Johnston Cotton Foundation

COTTON, America's largest agricultural industry, requires the use of larger quantities and more kinds of insecticides than any other crop. Shephard has estimated that 381 million pounds of formulated dust insecticides and 5,260 gallons of spray concentrate were applied to cotton in 1950. The retail value of the insecticides applied to cotton each year has been estimated at $38,125,000 to 75 million dollars, and the cost of application at nearly 20 million dollars.

Statistics on losses due to insects are more complete and accurate in the case of cotton than for any other crop. The estimated annual reduction in the cotton crop due to insect damage, as determined by the U. S. Bureau of Agricultural Economics, ranges from 6.7 to 26.9%, or, as has been well expressed, the insects take every seventh bale. The yearly tax insects place on the cotton industry has been estimated at $494,000,000, and this despite the extensive use of insecticides and other control practices; also despite considerable research and the operation of a moderately well staffed Extension Service. This loss is being experienced regardless of the fact that the world's worst cotton pest—the pink bollworm—has not been an important factor until 1952. It will be remembered that in 1952 the pink bollworm caused a loss of about 29 million dollars in 39 south Texas counties. Again in 1954 the pest did serious damage, particularly in south central Texas even during this dry year. It must be emphasized however, that the per acre yield of cotton has been increased materially in the last few years.

The pink bollworm has demonstrated its capacity for crop damage under diverse climatic and agricultural conditions. It is a pest of importance in every country of the world where cotton is grown with the exception of Central America, Peru, and Ecuador. It is widely distributed in Africa, being a serious problem in Algeria, Belgian Congo, Egypt, French West Africa, Kenya, Madagascar, Morocco, Nyasaland, Nigeria, Tanganyika, Uganda, and Zanzibar. In Europe it is a damaging pest in Cyprus, Greece, Italy and Turkey. In Asia it is responsible for moderate to heavy losses in Burma, China, Formosa, India, Iraq, Korea, Manchuria, Palestine, and Thailand. It is of some importance as a pest of cotton in many of the Pacific Islands, including the Philippines, Java, Fiji, and Hawaii. It is present wherever cotton is grown in Australia. The West Indies are thoroughly infested and in some of them, the growing of sea island cotton has been abandoned. This is essentially true in the Virgin Islands and Puerto Rico.

South America has its pink bollworm troubles too. In some areas of Argentina, Paraguay, Brazil, and Bolivia it causes serious losses.

So, it may be said that California and the northern, central and eastern portions of the cotton belt in the United States are the only important cotton growing areas of the world not infested by this insect.

The cotton producers of these areas of the U. S. already have troublesome insect problems, especially in the southern and southeastern states. Superimpose the pink bollworm on the boll weevill, bollworm, fleahopper, aphid, thrips, leafworm, red spider

(*Continued on Page* 125)

*Abstracted from a talk by Dr. Bishopp at the annual meeting of the Entomological Society of America in Houston, Texas, December 6-9, 1954.

Garden Supply

THERE'S big business ahead for manufacturers and dealers in garden chemicals and equipment. A tremendous expansion in sales to the home gardener in the next few years was forecast at the 11th National Garden Supply trade show in Chicago, Jan. 10-12. Outstanding factor in this growth, Dr. Vergil Reed declared in a conference at the opening of the show, is the fact that America is rapidly going suburban. Dr. Reed, who is associate director of research for J. Walter Thompson Co., New York, was formerly connected with the U. S. Census Bureau and with several consumer market research agencies.

"The middle income families, particularly the younger ones with children, are heading for the suburbs," said Dr. Reed. Other factors which Dr. Reed analyzed as to their bearing on growth of the garden supply trade included the national growth in population—("It will be 160 millions one week from tomorrow," he said)—lengthening life expectancy, decreasing mortality rates, "sundown farmers," the rise of integrated shopping centers in suburban areas, and the increase in number of households . . . and many new gardens.

Dr. Reed reminded his hearers that the potential consumers of garden supplies still have to be 'sold' aggressively. "Stimulating consumer desire to buy and turning that desire into actual sales," he said "is your major job. That responsibility the manufacturer shares with you. To gain the maximum mutual profits, both of you must know your markets well, their size, characteristics and the changes taking place in them."

Some 230 manufacturers filled the Hotel Sherman's exhibition areas for what was hailed as "the largest garden supply show ever staged." Most of the exhibitors were scheduled to appear again at the repeat performance of the show which was to be held in New York at the 71st Infantry Regiment Armory, Feb. 1-3.

A survey of the show indicated that aerosol bombs for dispensing insecticides, fungicides and fertilizers are a significant new development of potentially increasing importance. Home gardeners, it was reported, view the aerosol dispenser with great favor because of the ease with which the chemicals can be handled.

It was also noted that the "band wagon" rush to capitalize on "soil conditioners" has apparently about run its course. Most of the more than a score of manufacturers who offered this product at the Chicago show two years ago, were conspicuously absent this year.

Another development manifest at the Chicago affair, of interest to manufacturers of chemical fertilizers, is the growing list of organic fertilizers which have a piscatorial base.

American Chemical Paint Co., Ambler, Pa., showed its full line of garden chemicals and featured a new crabgrass killer with an improved formula containing MCP, in consumer size packages. The company's "Weedone" weed killer also received abundant free publicity all over the place because of the paper hand bags, given all visitors to the booth. Prominently on each bag was the word "Weedone" in large print.

Faesy & Besthoff, Inc., New York, attracted considerable attention from Chicagoans in particular with their display of "Orgoni-green" fertilizer, made from Chicago sewage sludge, fortified with chemicals to make a balanced plant food. S. Besthoff, vice president described to visitors, the F. & B. complete line of home and garden chemicals. A new rose dust containing captan, released to the market only a month earlier, was the newest addition to the F & S line exhibited

Boyle-Midway, Inc., New York showed three aerosol products for insect control on roses, lawns, and African violets. First showing was made of a new "Ridz" dog repellent aerosol and among other items were an ant killer bomb and a pelletized compound for snail control.

Plant Marvel Laboratories, Chicago, made first showing of two aerosol insecticides for African violets and roses, also a new "Lawn Marvel"

Trade Show

By H. H. Slawson
Chicago, Ill.

plant food whose slogan was "Feed as you water."

Thompson Chemicals, Inc., St. Louis, Mo., showed a "Weed-A-Bomb" aerosol herbicide, and "Repella bug fix," an aerosol to repel bugs on clothing and hands. Announced for early availability was a new aerosol, believed to be the first on the market for killing poison ivy. Four other aerosol products are also under development for trimming lawn edges, controlling crabgrass, killing ants and fertilizing plants. Among products shown were insecticides, weed and brush killers, hormone sprays for grapes, strawberries, tomatoes, etc., and "Color Fix" for preharvest fruit drop.

Plant Tabbs Corp., Baltimore, introduced a new plant food for aquarium vegetation, along with their established line of plant food tablets.

California Spray Chemicals, St. Louis, made their first showing of a new garden fungicide with 50 per cent captan, also a new fly killer bait with 2 per cent malathion for home use. On an "Orthocide merry-go-round" were mass displays of garden sprays, dusts, etc. from the company's extensive line.

Armour Fertilizer Works, Chicago Heights, Ill., featured "Vertigreen" lawn plant food in 5, 10, 25, 50 and 100 lb. bags. Monsanto Chemical Co., St. Louis, Mo., displayed "Krilium" soil conditioner which has stood the test of time, also "Bogey" for garden pest control, and "Folium" water soluble plant food with applicator.

Rose Mfg. Co., Beacon, N. Y., had a new 12 oz. rose bomb, introduced a month earlier, which is claimed to be the only commercial product containing both an insecticide and a fungicide. A new floral and garden dust was introduced, also "Tri-Ogen" plant food in consumer size packages.

Standard Oil Co. (Ind.) showed their varied line of agricultural chemicals, including a crabgrass spray and a weed killer in small packages or in bulk. For communities suffering from Dutch elm disease there was a dormant spray, "Dendrol," and a 25 per cent DDT spray. Shown, too, was Standard's "Mothban" aerosol, with DDT, methoxychlor and pyrethrins, which, it is claimed, will mothproof fabrics for one year where formerly 6 months was the limit.

Swift & Co., Chicago, promoted their new "Golden V" non-burning Vigoro lawn food, just introduced after 15 years of research and testing. Also shown was the full line of "End-O-Pest" dusts and sprays for the garden. Science Products Co., Chicago, announced its new "Blossom-set" aerosol hormone, for direct application, and also new packaging for dieldrin for sale to the home garden market.

Acme Quality Paints, insecticide div., Detroit, introduced four new products—a rose dust with captan and karathane—another new all-purpose rose dust with the two fungicides mentioned above, plus malathion for insect control—a fly bait containing malathion with sugar—and "Dieldrin 18," for control of termites, box elder bugs and lawn, garden and home insects.

Black Leaf Products div., Virginia-Carolina Chemical Corp., had a large display of their home and garden chemicals and representatives stressed a "spring deal" for B-L products at special prices to dealers.

Du Pont Co's display centered around a new complete rose dust with insecticide and fungicide. Attention was drawn to new weatherproof packaging for concentrate chemicals and shown for the first time was a new portable metal display rack. H. A. Weibel, sales manager, and E. O. Scaline, advertising manager, garden chemicals div., in charge.

B. G. Pratt Co., Paterson, N. J., had a new "DX" aerosol spray for African violets and general insect control. For the "do-it-yourself" folks there was a new 72 per cent chlordane spray for subterranean termites, which had been released to the market two weeks earlier. Also announced was a 5 per cent DDT bulb dust, to appear early in February.

Among other exhibitors of garden chemicals were Nott Mfg. Co., Mt. Vernon, N. Y., Goulard & Olena, Skillman, N. J., Magma Corp., Chicago, Stim-U-Plant Labs., Columbus, O., Niagara Chemical Co., Garden Research Labs., New York.

H. D. Hudson Co., Chicago, made their first showing of a new hand garden sprayer for the suburban mass market, and drew attention to a new safety clip-on compression type sprayer and to the adjustable nozzle now on all Hudson sprayers. A new merchandising unit for dealers was given its first showing and demonstrated, too, was a "Weed Shooter," with herbicide magazine in the handle for spot-killing of weeds.★★

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Corn is only one example. Actually, there will be many applications for this nitrogen: as fertilizer for other feed and fiber crops; as a protein source for feed supplements; for industrial uses such as the manufacture of plastics, synthetic fibers, pharmaceuticals, and in petroleum refining.

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Agricultural Chemicals talks to

John Riley
Consultant, New York
Clyde Marshall
Commercial Solvents Corp.
Dan Curll, Jr.
Chemical Enterprises, Inc.
Hugo Riemer
Nitrogen Division, Allied Chemical & Dye Corporation

for a look at the

Nitrogen-Ammonia Supply Outlook

CONTINUING additions month after month to American plant capacity for production of anhydrous ammonia and urea have finally given rise to a feeling of concern that the boom in construction may already have resulted in building up production facilities to a point far in excess in demand. At its recent meeting in New Orleans officials of the Anhydrous Ammonia Institute called attention to this situation in a general report which observed that "the large number of new plants . . . points to a dangerous oversupply of ammonia in the season ahead." In the face of this threatened oversupply, the Institute embarked upon a program to stimulate sales and expand the market.

More recently, K. A. Spencer of Spencer Chemical Co., in a talk at a meeting of Boston Security Analysts Society in Boston, also recognized the same threat to stability in the industry.

Mr. Spencer referred to "a rapid transition in the nitrogen industry from a situation of scarcity to one of surplus. In 1941, three major companies and two minor producers were producing 428,000 tons of nitrogen . . . by last summer, some 21 companies had entered the field and nitrogen capacity reached 2,685,000 tons. It is expected to reach about 3,040,000 tons by next July.

"It seems to me that everytime I reach for a newspaper these days, I read that someone is building a new synthetic ammonia plant. Everybody wants to get into the act."

"The short term future in the nitrogen field will be increasingly competitive," he said, "with resultant pressure on the profit margin . . . we believe the longer term future—beyond 1958—is bright."

With this undertone of caution, and the several warnings of possible overproduction of ammonia in the near future, *Agricultural Chemicals* interviewed prominent figures in the anhydrous ammonia industry to get representative informed opinions on the background, present status and future outlook on the anhydrous ammonia picture in relation to the whole question of U. S. as well as world nitrogen supplies.

John Riley, formerly with Spencer Chemical Co., and now a consultant in New York City, advanced the opinion that U. S. productive capacity for anhydrous ammonia for 1955-1956 will be about 6 to 8 per cent greater than demand. When the ammonia plants now under construction or in advanced stages of planning are completed, (about '57-'58) productive capacity may be as much as 9-11 per cent greater than demand. Mr. Riley pointed out however, that an "oversupply" of only 10% is not a particularly unusual situation in any basic market, particularly a chemical market. It is not always easy or even possible to keep supply geared precisely to the exact requirements of demand. And normally, it is a healthier situation to have supply slightly in excess of demand rather than the reverse.

An important consideration in the fertilizer supply-demand picture is the fact that population is increasing at the rate of 2-2½ million per year, while cultivatable land is necessarily limited. Since a crop of about 3 acres (according to today's standards) is required to feed and clothe each person, it is obvious that higher yields per acre are absolutely essential to handle the increasing population . . . and the only way of increasing these yields will be through fertilization of the land at higher levels. Contributing to this analysis are USDA statistics showing that: (1) 25 per cent of the production of food and fiber is directly attributable to commercial fertilizers; and (2) that only 15-20 per cent of the cultivatable acres in the United States now receive commercial plant foods.

Storage Important Problem

EVEN with this greater eventual use of fertilizer (which takes in all forms of plant foods and basic elements), the *immediate* problem of a potential oversupply of anhydrous ammonia is of course still of pressing interest. Mr. Riley points out that the problem seems to be two-fold: first, and what appears to be most important, is the question of anhydrous ammonia storage, and second,

(*Continued on Page* 143)

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2. Solvent used _____
3. For water hardness _____ ppm.
4. Recommended dilution _____
5. Lbs. toxicant/gal. of concentrate _____
6. Desired emulsion stability _____
7. Shelf life period expected _____
8. Ease of dispersion important? _____
9. Packaging: bulk _____ or small container _____
10. How is concentrate mixed and evaluated in laboratory tests? _____

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Notes From The

EXPERIMENT STATIONS

By Charles E. Palm

MANY entomologists have had the experience of having to say, "our results for last year were not particularly significant because the infestation didn't develop as expected," or, "we located our plots where last year's records indicated there would be heavy infestations, but for some reason they didn't develop this year, etc." Words to this effect are common expressions of experiences among field workers of the experiment stations and industry. Yet industry has the further need for accurate forecasting of pest infestations due to its necessity for manufacturing and distributing supplies of needed insecticides where, when and in the amounts needed by farmers to control their insect infestations. With our accumulated knowledge about insects, why can't we do a better job with population forecasts?

Well, the truth seems to be that we don't know enough about the complex of biological and physical factors that make up the environment to accurately predict their effect on insect populations. The field of ecology which deals with the study of an organism in relation to its environment, is rapidly coming to light as being one of the poorer understood, yet extremely important phases of entomology. Fluctuations that occur in insect abundance are largely the result of chance combinations of environmental factors rather than an inherent, mandatory cycle. We do recognize outbreaks of certain species, for example the forest and apple tree tent caterpillars, occurring with some degree of regularity. With long life cycle species like our native white grubs, it is easy to plot out the years when grubs will be present and cause injury, but their abundance is another matter that is subject to environmental conditions. Then too, some cycles appear to build up over a period of time and then the species reaches a peak population for a brief period before subsiding into normalcy. It may be that points of intense infestation, or hot spots, develop over the range of the species, leaving areas of light infestation between. Why isn't the infestation uniform? Will the next generation spread out to new areas? These and other questions are occupying the attention of capable scientists in our federal and state experiment stations because one of the most valuable assets that economic entomology could have is the ability to forecast accurately the population levels of pest insects in the major producing regions of the nation.

Perhaps we should recall in pondering these problems, that we are dealing with dynamic creatures, endowed with an innate capacity to reproduce far in excess of the reproductive capacity of higher animals. Insects are cold-blooded and respond to many of their life processes in direct proportion to the temperature in the environment. Their small size, short life cycles and omnivorous food habits establish them as highly competitive animals in nature. Thus far they have done a good job of looking after themselves and, if anything, seem to be moving about over the face of the earth with increasing ease as man perfects his methods of transportation. Insects pit their reproductive potential against the environmental resistance to determine populations at a given time.

Surveys Valuable

INSECT pest surveys are of great value in taking inventory of the current status of pest populations and the species involved. Further, they call attention to developments that may well extend beyond their point of origin and thus keep entomologists and industry on the alert for the development of outbreaks. The press and radio have been valuable aids to the extension entomologists, informing the farmers of insect development and measures that can be taken to control pest species.

Surveys uncover a species beyond its normal range of distribution and help keep us abreast of new problems as they develop. The pesticide industry is able to use insect pest survey reports in making certain that available control materials will be on hand at the right places when needed. Many times it is possible to correlate definite climatic or biological factors with the rise and fall of pest abundance, thus aiding entomologists in the future to be on the look out, so to speak, for an outbreak following a repetition of similar favorable environmental conditions. Obviously these are but a few examples of the many valuable returns from insect pest surveys.

Fundamental Studies in Ecology

IMPORTANT though statistics may be on current status of insect populations, there is need to go much deeper into the fundamental nature of population dynamics. During the early years of the past century of professional entomology, farmers lacked the effective tools for chemical control and were forced to rely on all types of cultural and mechanical practices to fight insect pests. Through the expanding knowledge of the life and seasonal history of a pest, early economic entomologists were able to suggest crop rotations, time of planting, sanitation, mechanical barriers etc., and more recently the use of hybrid and resistant varieties of plants to aid in reducing insect losses. In a broad sense, they were manipulating factors in the environment that worked to the detriment of the insect they were attempting to control. Great strides were made through the use of biological factors, including the use of parasites and predators to control certain pest

(*Continued on Page* 128)

LISTENING *Post*

Seed-Treatment tests on Oats for Smut Control 1953-54

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

R. W. Leukel of the U. S. Department of Agriculture, Agricultural Research Service, has compiled results of the 1953 tests for smut control in wheat and oats.

Winter Wheat and Oats Experiments

In the fall of 1953, 22 chemical fungicides or mixtures were applied to bunt (*Tilletia* sp.)-infested seed of Purplestraw wheat. 19 of these were applied also to seed of Fultex oats naturally infected with loose smut (*Ustilago avenae*). The wheat was sown in triplicated rod rows in the field two days after treatment, and in triplicated 5-foot rows in outdoor beds one week after treatment. The higher percentages of infection in the second planting indicate that temperature or moisture conditions were more conducive to infection after the second planting.

The oats were sown in the field and in outdoor beds three days after treatment. Germination tests of treated and untreated wheat were made three months and again six months after treatment. Infection data were taken in the 5-foot rows by counting the total and the infected heads in each row in both the wheat and the oats. In the rod-rows in the field the smutted heads were counted in all of the rows and the total heads were counted in representative rows. The number of heads in the other rows was estimated. These data are presented in Table 1.

Discussion:

No explanation is offered for the contrast (Table 1) between 92.5 per cent bunt in the first check and only 10.5 per cent in the second check in the 5-foot rows, or between 76.3 per cent and 26.7 per cent in the rod-rows. Talc is an inert material used frequently as a diluent in dust fungicides and is not known to have any fungicidal properties. A similar effect was not observed in oats.

Bunt was controlled more effectively in the beds than in the field, although the two checks in the beds showed a higher degree of infection because environmental conditions after planting were more conducive to bunt infection. Fourteen treatments elminated bunt in the beds, compared with only five in the field. Seventeen treatments in the beds reduced infection to less than 1 per cent, compared with only nine such reductions in the field. Since the beds were planted later than the field plots it is possible that the longer storage of the seed after treatment made the fungicides more effective in controlling bunt.

In the oats only Panogen eliminated smut in both series. Ceresan M and M2X controlled it in the five-foot rows but allowed 0.4 and 0.1 per cent, respectively, in the field. No other material except Dupont 244 reduced infection to less than one per cent in either series. Mycon was less effective than in previous tests, possibly because of deterioration due to age. Although this product has been found very effective by several investigators, it will not be produced commercially. On the whole, the control of loose smut in oats was somewhat unsatisfactory, as only five materials reduced infection to less than five per cent in both series of tests. It is possible that smut infection in this oat variety is more difficult to control than in some other varieties.

Spring Wheat and Oats Experiments

Field tests of fungicides applied to bunt-infested seed of Red Bobs wheat and seed of Canadian oats naturally infected with loose smut and with covered smut (*U. kolleri*) were carried out at six experiment stations, with the generous cooperation of the following workers who planted the seed and took the data at their respective stations:

D. C. Arny, Madison, Wis.
W. E. Brentzel, Fargo, N. D.
C. S. Holton, Pullman, Wash.
Benjamin Koehler, Urbana, Ill.
M. B. Moore, St. Paul, Minn.
C. W. Roane, Blacksburg, Va.

The wheat was inoculated with bunt spores at a 1 to 200 dosage, after which the fungicides were applied and subsequent germination studies made. Treated and untreated seed was sent to cooperators at five stations, where it was planted in rod-rows, and infection data taken at the proper time. These data are presented in Table 2. The Canadian oats seed was similarly treated, packeted, and shipped to the different stations for planting. The data on infection and smut control are shown in Table 3. (Tables 2 and 3 are on page 126)

It will be observed in Table 2 that at three stations there was a much lower percentage of bunt infection in the first check than in the second check. This difference was due to the failure in packeting to properly "insulate" the untreated seed in these packages from the seed treated with Panogen. All the other seed lots

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were separated from each other by sufficient material to prevent them from being affected by the neighboring lot of treated seed.

At four stations all the materials eliminated bunt. At Pullman, with 80 per cent bunt in the checks, nine materials allowed from 0.2 to 3 per cent infection. Five of these were mercurials. Only one material appeared to be harmful to the seed. The mercurials were more effective in checking seedling blight than were the five non-mercurials.

Infection by oat smut at the different stations ranged from 8.1 to

(*Continued on Page* 127)

Boll Weevil 1954 Fall Hibernation Reports

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Economic Insect Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

EXAMINATION of ground trash samples collected during the fall months of 1954 has been completed in several states. Although the boll weevil problem will depend largely upon the number of weevils which survive the winter as well as conditions after emergence, the data collected to date would indicate, in most cases, about an average or below average boll weevil population for the beginning of the coming season. A similar survey will be conducted in most of the areas during the early spring to obtain survival data.

The trash samples, in most instances, were collected jointly by the Cotton Insects Section, Entomology Research Branch, and personnel of cooperating agricultural agencies in the states concerned. With the exception of Tennessee and Georgia, all samples were processed by the Cotton Insects Section. In Tennessee, all of the work was performed by the Insect and Plant Disease Control Office of the State Department of Agriculture; and in Georgia all work was performed by the Univ. of Georgia Exper. Sta. and Extension Service.

Counts from Madison Parish, La., show the 1954 fall average to be 1.1 times the average for the past 18 years. The number of live weevils per acre ranged from 242 to 7,502 with the average being 2,686. In the 18 years during which hibernation counts have been made, the following six have a higher average than 1954: 1942, 1945, 1946, 1949, 1950 and 1953. Trash samples for which no comparative data is available were taken at two points in each of the Parishes of Ouachita, St. Landry, Avoyelles, Red River and Bossier. Live boll weevils collected in these Parishes average 1,548 per acre.

In McNairy county, Tenn., an average of 311 live weevils per acre was found. This compares to an average of 31 in 1953; 2,259 in 1952 and 239 in 1951.

TABLE 1

	Seed Treatment			(A) Emergence after		(A) Percent bunt in wheat in		(B) Percent bunt in oats in	
No.	Material	Form	oz./bu.	3 Mo.	6 mo.	Beds	Field	Beds	Field
1.	Check	—	—	70	74	92.5	76.3	54.2	20.5
2.	Ceresan M	slurry	½	81	86	0	0	0	0.4
3.	Ceresan M2X	"	¼	79	85	0	0.1	0	0.1
4.	Dupont 244	liquid	¾	80	89	0	0	1.2	0.4
5.	Dupont 364	"	½	78	82	0	0	10.0	7.4
6.	Mycon	slurry	1	70	69	0	0	9.2	6.0
7.	Arasan SFX	"	1	86	86	0	0.8	42.9	13.4
8.	Mycon + Arasan	"	1	80	84	0	0.2	11.5	5.4
9.	Check + Talc	"	½	79	83	10.5	26.7	55.7	17.6
10.	Pura C-4-10	"	½	77	86	0	1.3	7.3	3.0
11.	Pura C-13-1212	"	½	71	84	0	1.4	2.0	1.3
12.	Actidione (1%)	"	½	54	75	1.0	1.7	12.7	7.9
13.	Actidione + Arasan	"	1	64	57	0	1.2	13.4	9.1
14.	Actidione + Orthocide	"	1	53	51	1.0	2.3	9.2	17.9
15.	MEML (SML 30)	liquid	½	86	78	0.2	1.2	7.0	6.2
16.	MEMA-F.R. 161	"	½	81	76	1.2	7.3	8.2	6.6
17.	Check + Water	"	1	71	74	79.3	55.6	45.1	38.6
18.	Setrete	"	½	76	74	0	1.2	2.1	6.0
19.	Panogen	"	¾	80	88	0	0	0	0
20.	Agrox	slurry	½	85	82	0	1.4	13.2	7.6
21.	Crude helixin	"	2	83	80	8.5	20.0	33.5	18.7
22.	275-D	"	2	75	73	1.1	2.0	—	—
23.	Vancide	liquid	4	87	89	0.1	1.2	—	—
24.	Anticarie	slurry	½	74	76	0.3	1.5	—	—
25.	Anticarie + Arasan	"	1½	82	80	0	0.2	—	—

(A) — Emergence and bunt control in Purplestraw winter wheat grown from inoculated seed, treated as shown and sown in triplicate in 5-foot rows in beds near greenhouse, and in rod-rows in the field.
(B) — Effect of same treatments on infection by loose smut in Fultex winter oats grown from naturally infected seed and similarly sown in beds and in field plots, 1953-54.

Trash examinations were made in four regions in Georgia. The 1954 fall average was 99 live weevils per acre of surface trash as compared with 1,984 in the fall of 1953. The breakdown by areas follows: northwest 290 live weevils per acre; north central 68; east central, zero; and south 48. Live weevils were found on only 14 per cent of the 49 farms examined. This is the lowest fall count in Georgia since records were started four years ago.

The number of boll weevils per acre found in surface trash examined in Florence County, S. C., ranged from zero to 11,132 with all samples averaging 2,299. This compares with an average of 3,533 per acre in the fall of 1953 and an average of 4,355 per acre for the 12-year period in which examinations have been made in the county. Darlington County counts from six farms ranged from zero to 4,840 per acre with an average of 2,097.

Trash collections were made from five farms in each of nine counties in North Carolina for boll weevil hibernation counts. The average number of live weevils per acre for all samples was 1,334 with county averages as follows: Sampson 2,904; Cleveland 290; Rowan 1,549; Halifax 2,614; Scotland 968; Hoke 484; Franklin 1,065; Wilson 2,130 and Harnett none. Under date of January 5, 1955, Mr. George D. Jones, North Carolina extension entomologist, issued a statement to the effect that the boll weevil carry over in North Carolina could be the lightest in recent years.

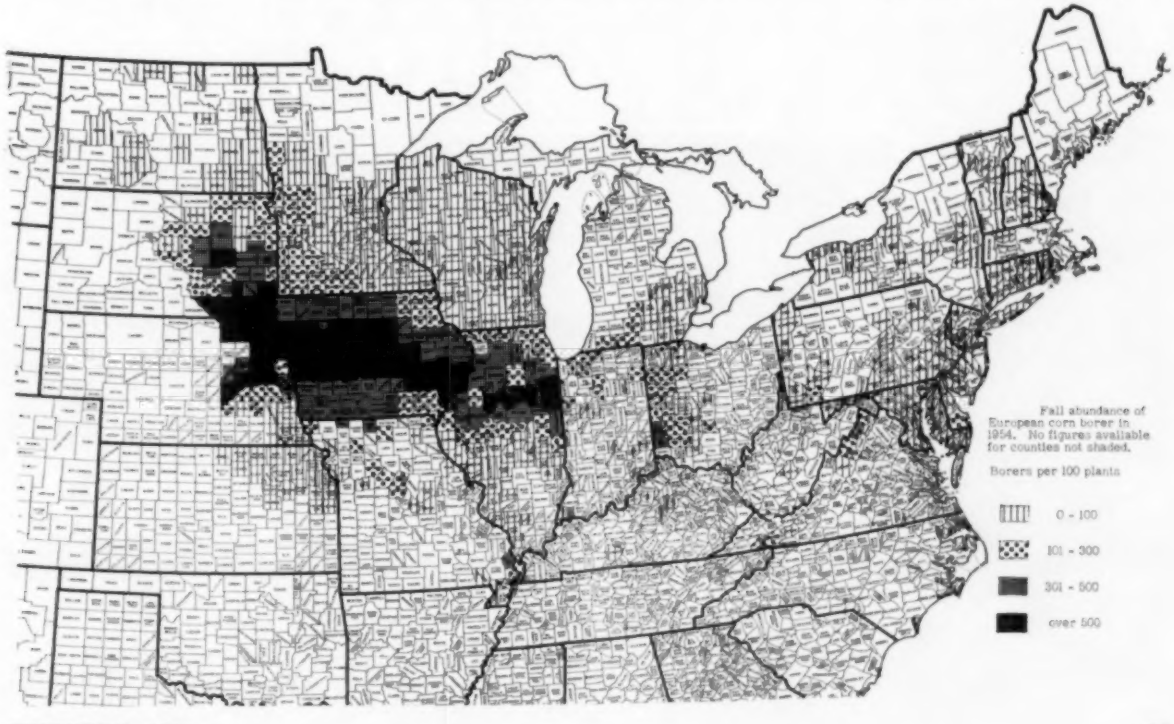
In Virginia, surface trash was collected from 20 farms in three counties. Samples from Southampton County had counts ranging from zero to 7,744 per acre with an average of 2,759. Brunswick county ranged from 968 to 4,356 weevils per acre and had an average of 2,130. In Mecklenburg County the counts ranged from zero to 968 with an average of 484 per acre. The average number per acre for all samples taken in Virginia was 2,033.

European Corn Borer Hibernation Mounts High in N. C. States

AGRICULTURAL agencies in 25 states conducted surveys to determine the number of European corn borers that went into hibernation in the fall of 1954. The insect was not found in any new state; consequently, the number of known infested states remains 37. There were, however, new county records in several states increasing the number of known infested counties to 1,596. States reporting new county finds together with the number of counties involved follow: Arkansas 2; North Dakota 2; Oklahoma 2; South Dakota 4; Virginia 4; and West Virginia 2.

Hibernation counts were made in 608 counties of the 25 states which conducted the survey. Counts in the North Central states showed a marked increase over those of the 1953 fall survey. Large areas through central Iowa, northeastern Nebraska and southeastern South Dakota had infestations of more than 500 borers per one-hundred corn stalks. Several counties in central Illinois were found to be in the same category. In most counties adjacent to this high population, the counts were found to average beween 300 and 500 borers per 100 stalks. See accompanying map. In the 13 North Central states the average number of borers per 100 plants was 223 as compared with the 114 found in the fall of 1953. All states in the group showed an appreciable increase except Kansas, Kentucky, North Dakota, Minnesota and Wisconsin. For the area as a whole 74 counties recorded populations of

(*Continued on Page* 127)


Fall abundance of European corn borer in 1954. No figures available for counties not shaded.
Borers per 100 plants
0 - 100
101 - 300
301 - 500
over 500

For Meritorious Service...

For positive action in improving morale and efficiency of the herd. Tranquility and contentment now replace frustration and confusion. Operations have changed from battling flies to bottling milk — with increased production and greater profits.

DIAZINON* fly bait

*DIAZINON is a registered trademark of Geigy Chemical Corp.

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DIAZINON is the sensational new phosphate insecticide developed by GEIGY research laboratories, the originators of DDT insecticides. DIAZINON possesses both quick killing ability and long residual action, necessary for effective fly control. Extensive tests have shown: 98% reduction of flies each day of application of DIAZINON FLY BAIT – flies begin to die within 10 to 20 minutes after application of bait – DIAZINON FLY BAIT is extremely economical, 1 lb. treats 12,000 to 16,000 sq. ft. of floor space – fly control with DIAZINON FLY BAIT means healthier, more productive livestock.

Dealer and distributor inquiries invited.

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WASHINGTON *Report*

by
Donald G. Lerch
Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

THE more bacon and eggs—roast beef and ice cream you eat—the more acres of land flow into your stomach in a year's time. In Asia, many people live on less than one quarter of an acre a year. In the United States, it is about three acres a year. This is the basis for a major project the Department of Agriculture is developing to solve the problem of surplus and at the same time up-grade the national diet.

There is tremendous potential here and it is of major importance to every company that sells farmers, particularly fertilizers and pesticides. Reason is that one of the best ways to up-grade the diet is to sell those food favorites ranging from ham to ice cream pie, for less money. This can happen when new research develops more knowledge, and industry makes available to the farmer more products and materials which will enable him to produce at a lower cost. For instance, it takes 29 pounds of grain to produce one pound of beef. It takes 17 pounds of corn and other grains to give you a pound of pork and 11 pounds of feedstuffs to give you a pound of chicken or turkey.

Imagine the amount of surplus grain that would be consumed if we all ate an extra pound or two of beef a year. Strange as it may seem, this great land of wealth is not tops in meat consumption. We're only fourth or fifth, with Australia and New Zealand notable examples of countries eating more meat and livestock products than we do.

Part of this research plan will be unfolded in testimony before Congressional Committees. You'll see other parts of it in speeches made by Department officials in late winter or early spring. It sets the pattern of the Department's thinking.

* * *

Secretary Benson is very much "management minded." So is the Undersecretary, True Morse. So also is the newly-appointed Commodity Stabilization Service Administrator, Earl M. Hughes, of Woodstock, Illinois. Born and reared on a farm near Woodstock, Hughes has devoted his entire career to agricultural production and marketing work.

Since pesticide manufacturers must compete for a farm income which has declined considerably during the past two years, it's significant to note that the Department's program is aimed at management which, of course, calls for an enlarged program of research by both private interests and Government. If the Government program succeeds at all, farmers are going to be even more management conscious than they have been up until this time.

The fertilizer associations appear to be well aware of this and for several seasons have directed their campaigns at citing the dollars and cents figures of fertilizer profits from practical farm use. These statistics are available for most states and are being used "in campaign intensity" in many parts of the country. This approach dovetails with that of the Government.

Whatever the reason, more actual plant food was used last year—the increase reaching 4% over the previous year. Approximately 72% of the plant food nutrients reached the farmer in the form of mixtures and 22% as separate plant food materials applied directly to the soil or mixed by the user.

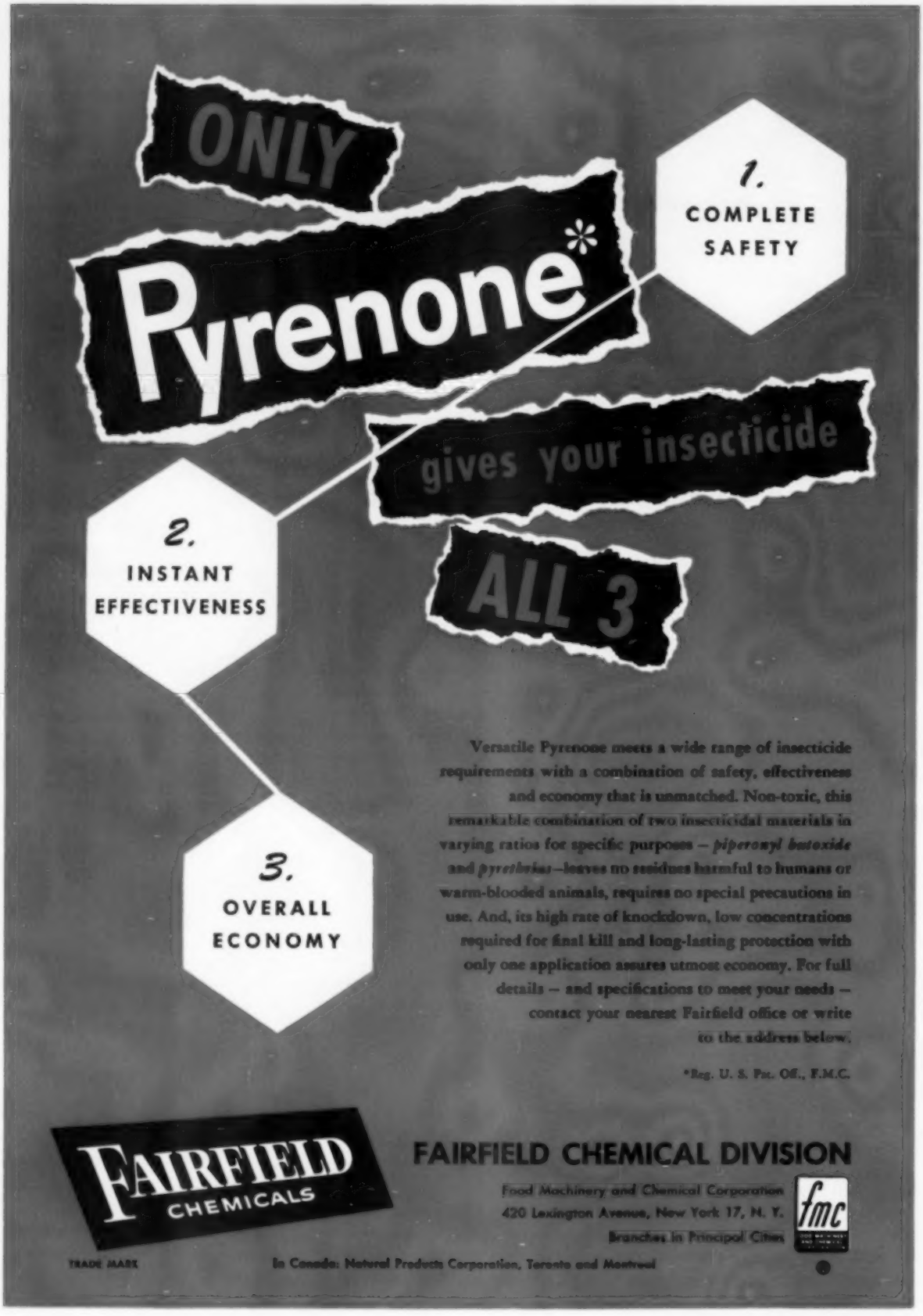
After two years of drought and declining income, this spring will be a real test of the industry's ability to continue to increase the amount of plant food used. The point is of course that even with declining income, the farmer can make more money by using more fertilizers as long as accepted agricultural practices are followed.

The pesticide industry has a most important role in this management concept. However, the problems of the industry are considerably different from those of the fertilizer manufacturers. The gains to the farmer can be more spectacular—at the same time they can be nil.

* * *

The insecticide industry is to be commended for working off its carryover stocks which now appear to be 10% below those of a year ago. Dr. H. H. Shepherd, staff specialist, Food and Materials Requirements Division of the USDA says—"It is certainly heartening to see the cooperation extended by manufacturers to make possible an accurate compilation of carryover stocks." Dr. Shepherd said that in some instances companies went to considerable work to submit the data on the compilation which the Department sent to the industry based on an official request from Lea S. Hitchner, NAC Executive Secretary, on behalf of the industry.

While Dr. Shepherd makes it clear that future studies of this nature are entirely up to the industry, the response received from this initial effort indicates a strong likelihood that most manufacturers would like to continue this annual summation. The survey included reports from 141 manufacturers representing the bulk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Versatile Pyrenone meets a wide range of insecticide requirements with a combination of safety, effectiveness and economy that is unmatched. Non-toxic, this remarkable combination of two insecticidal materials in varying ratios for specific purposes – piperonyl butoxide and pyrethrins – leaves no residues harmful to humans or warm-blooded animals, requires no special precautions in use. And, its high rate of knockdown, low concentrations required for final kill and long-lasting protection with only one application assures utmost economy. For full details – and specifications to meet your needs – contact your nearest Fairfield office or write to the address below.
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of pesticide producers throughout the United States.

"We're ready to continue this service if the industry wants it"—Dr. Shepherd said.

* * *

The NACA is readying a series of herbicide radio recordings featuring authorities throughout the United States, for distribution on request to radio farm directors. Jack Dreesen, herbicide specialist, NAC, will make some of the recorded broadcasts himself along with outstanding authorities from agriculture and industry.

It is expected that these recordings will be used over 200 stations. Distribution will be made to give sufficient "lead time" to farmers so they can buy materials to do a more effective job of weed and pest control. A similar series of recordings, distributed last year, was received very favorably by professional farm directors, many of whom requested that similar material be made available when timely. It is largely in answer to these requests that NAC is making this service available.

* * *

Joseph A. Noone, NAC Technical Adviser, is quarterbacking industry activity in what he believes to be one of the biggest state legislative years in history. Mr. Noone says—"Information I've received indicates that more insecticide acts are under consideration in state legislatures than ever before."

Members of the industry have a sizeable job to work through the Association either for the enactment of legislation to speed progress in the manufacture and usage of agricultural chemicals or to prevent unwarranted restrictions from stagnating development.

* * *

Food & Drug Commissioner George P. Larrick emphasizes the continuation of cordial relations between his agency and the industry in the matter of the Miller Bill regulations and tolerances under the 1950 Hearings

"There's been very little comment about the proposals and most of the recommendations have been such that we're able to accept them," Larrick said. The last few weeks have been devoted to ironing out the "final language problems in the issuance of the official tolerances and regulations."

* * *

The Food & Drug statement on grain sanitation is significant in that it was not a joint release with the USDA, as has been the case in most of the action to date. However, Commissioner Larrick states that the philosophy of the Food & Drug Administration actually will be based largely on an incentive and stimulating basis. He doesn't feel that Food & Drug is going to change conditions overnight. He definitely intends to make steady progress, however.

The problem of grain sanitation is a big one because of the mammoth grain surpluses we have at present. Food & Drug now has the authority to examine carloads of grain and to seize such grain if dangerous levels of contamination are found. Contamination from rats is under extensive security.

The announcement caught some officials of the USDA by surprise. It will soon be apparent how well the two agencies will work together on this matter. Indications at present are that realistic cooperative measures are being made by both.

Very shortly, the USDA will issue a statement launching an educational campaign on grain sanitation, which will be centered in the Federal-State Extension Services. The USDA will also call for a program of speeded up research to find improved methods for measuring contamination and to better control it.

* * *

NAC's new address—1145-19th Street, N. W., Washington, D. C.—gives members and visitors a location convenient to the larger downtown Washington hotels. The air conditioned building is also the headquarters for the "association executives association." The national association of associations is also located in this building with a suite of meeting rooms for organizations such as NAC.

USDA Revises Labeling Rules of Household Type Insecticides

INSTRUCTIONS to manufacturers to guide them in the labeling of household type chlordane insecticides under the Federal Insecticide, Fungicide, and Rodenticide Act are being revised, the U. S. Department of Agriculture announced early in January.

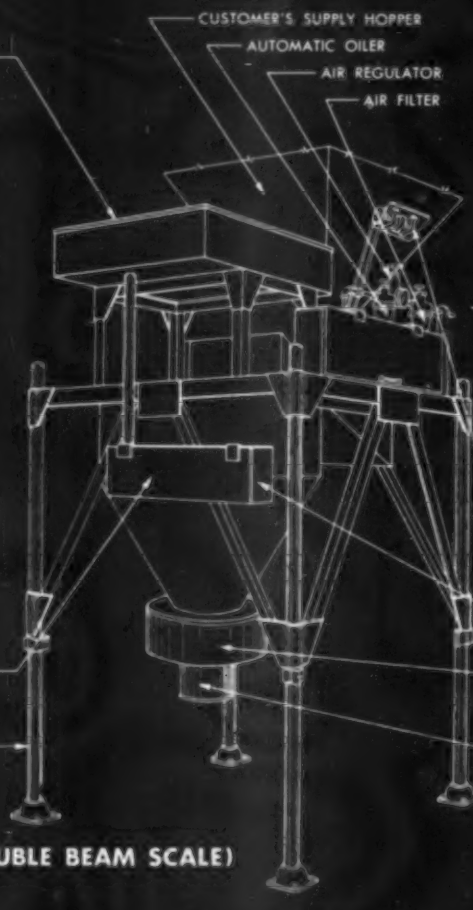
The revised instructions will relax limitation on strength of formula from the present 2½ per cent for emulsions and solutions to 3 per cent, and from the present 5 per cent for dry powder formulations to 6 per cent. Also, use of pressurized dispensers, which ordinarily contain 2 per cent of chlordane and should not contain more than 3 per cent, will be permitted. Such acceptable self-propelled sprays must deliver a coarse, wet spray.

Use of these insecticides in and around human dwellings will be permitted when their labeling shows that inside of premises they are intended for use only against one or more of the following: Roaches, waterbugs, silverfish, ants, brown dog ticks, carpet beetles, houseflies, wasps, mosquitoes, box elder bugs, crickets, scorpions, and clothes moths.

The revised instructions continue to restrict use of these insecticides against fleas and bed bugs. They also, in liquid formulations and pressurized sprays, forbid labeling that makes claims for spraying in the air or for the use of fine mist sprayers, claims or directions that might lead to the contamination of foods, or claims for safety or nontoxicity, and specify application of sprays only to infested areas.

The Department said this revision of instructions for labeling is based upon chemical evidence that present manufacturing processes can eliminate from technical chlordane marketed for insecticidal uses most of the hexachlorocyclopentadiene that used to be present as an impurity in considerable amounts.

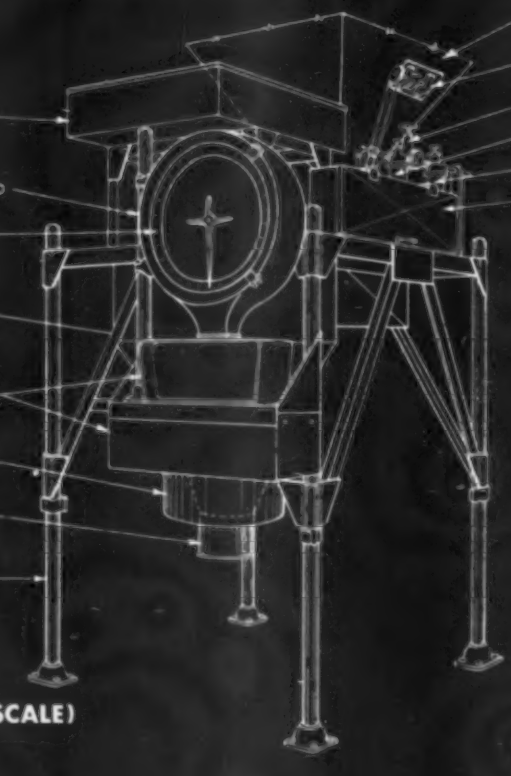
THE PLANT THAT DEMAND BUILT—Union's I & C Bagger is manufactured in this new Inglett & Corley plant, located in Augusta, Ga. Increased capacity insures prompt delivery of all models.



NEW

MODEL UB 100-A (DOUBLE BEAM SCALE)

for accurate high-speed weighing and packing of granular materials


CUSTOMER'S SUPPLY HOPPER
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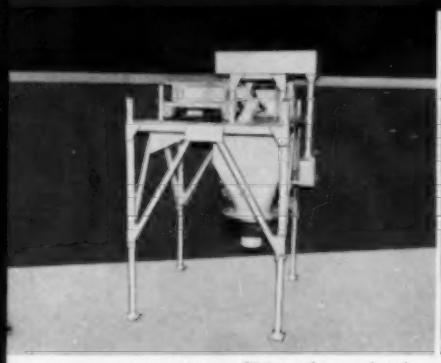
AIR REGULATOR
AUTOMATIC OILER
AIR FILTER
DUST SEALED AUTOMATIC CONTROL BOX
DUST SEALED SCALE BOX WITH OIL SEALED LEVER SYSTEM
CALIBRATED DOUBLE FACE, DIAL HEAD
VISIBLE DIAL CUT-OFF ELIMINATES NECESSITY OF CHECK WEIGHING
INSTANTANEOUS CHANGE FROM ONE WEIGHT UNIT TO ANOTHER BY SELECTOR SWITCHES
ALL SCALE PARTS DUST SEALED
FLEXIBLE DUST SHIELD
ADJUSTABLE BAG SPOUT
ADJUSTABLE TUBULAR LEGS

MODEL UB 101 (DIAL SCALE)

for finer weight tolerances and visible weight check



SIMPLIFIED INSTALLATION—Shipped completely factory assembled and checked. Can be installed in a matter of hours. Adjustable legs may be compacted. Unit can be readily moved into position and quickly adjusted to the supply hopper.

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500 TONS PER 8-HR. DAY—Completely automatic filling and weighing cycle. Close weight tolerance. Low in both initial and operating costs. Make your own comparison with any other packer.

MODELS OF UNION'S I&C BAGGER HELP OBTAIN

RECORD SAVINGS

IN THE AUTOMATIC WEIGHING AND BAGGING OF FEED, FERTILIZERS AND GRANULAR CHEMICALS

Finer accuracy, increased operating efficiency and convenience, and greater ease of installation have been incorporated in new Models UB 100-A and UB 101.

Performance records prove that the I & C Bagger substantially reduces packaging labor costs, increases production, and can bring about important economies in the cost of the Multiwall bags themselves.

SAVINGS OF OVER $50 A DAY

Typical of how the I & C Bagger improves packaging efficiency is the experience of a small fertilizer plant which is saving over $50 a day in reduced manpower and increased production, with a single machine. This manufacturer's newly developed capacity to service and load trucks faster has enabled him to add many new accounts.

ADD NEW UNITS; CONVERT MORE PLANTS

A major producer of plant food installed ten additional I & C Baggers and has just ordered two more. Another leading manufacturer has now converted nine plants to the I & C Bagger. Still another processor credits this outstanding new packaging unit with transforming a previously inefficient plant into a profitable one.

I&C Bagger *Automatic Weighing and Filling Machine for Open Mouth Bags*

Manufactured by **INGLETT & CORLEY, INC., AUGUSTA, GA.**

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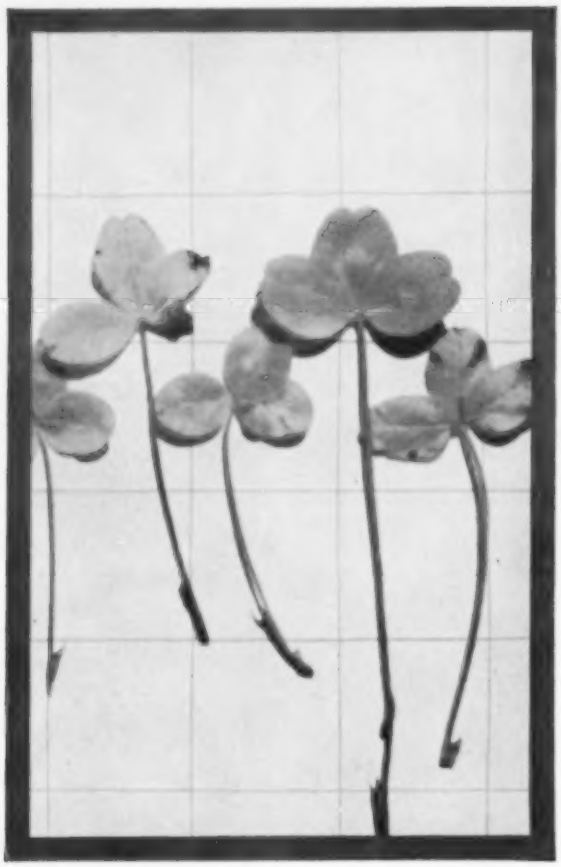
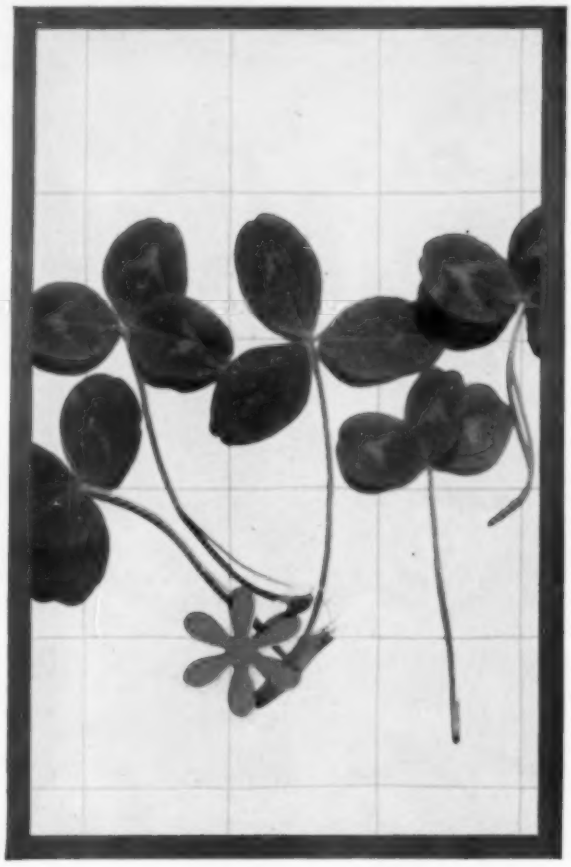
MULTIWALL PACKAGING MACHINERY DEPARTMENT





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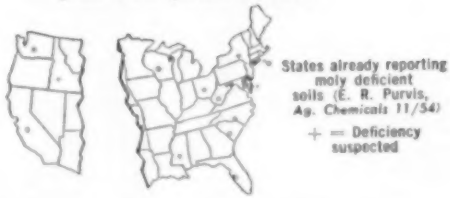
Pasture legumes need traces of molybdenum to fix nitrogen. Without moly, legumes are pale and stunted, and their protein content is low. Grasses are starved for nitrogen too.

Treating deficient soils with moly lets legume pastures put atmospheric nitrogen to work. Legumes grow dark and vigorous. Grasses thrive on the added soil nitrogen. Protein content rises sharply, and total pasture production may increase up to six times.

Test moly on your problem pastures and legume stands. You can apply it in fertilizer mixtures, in sprays, or on seed. Write for our bulletin "Testing for Molybdenum Deficiency." Department 43, Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.

Here's where moly can improve pasture production



Moly is most likely to be needed east of the Great Plains, in the Pacific Northwest, and along the Gulf Coast. Moly deficiencies are most common on soils that are:

1. Highly acid
2. Heavily leached
3. High in iron oxides
4. High in manganese
5. Heavily dressed with sulfates
6. Heavily cropped

learn why, first hand:

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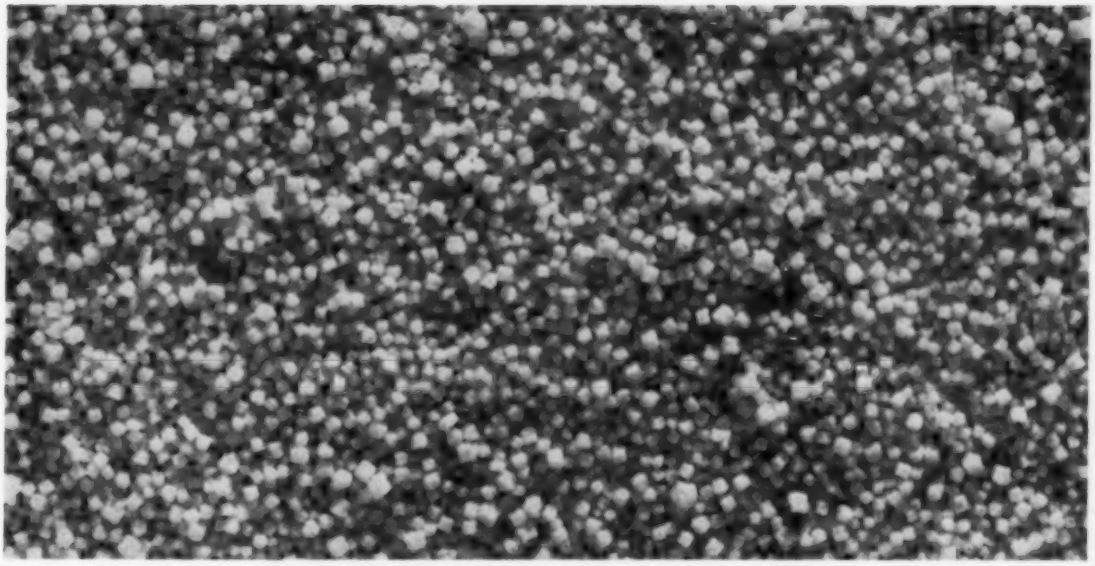
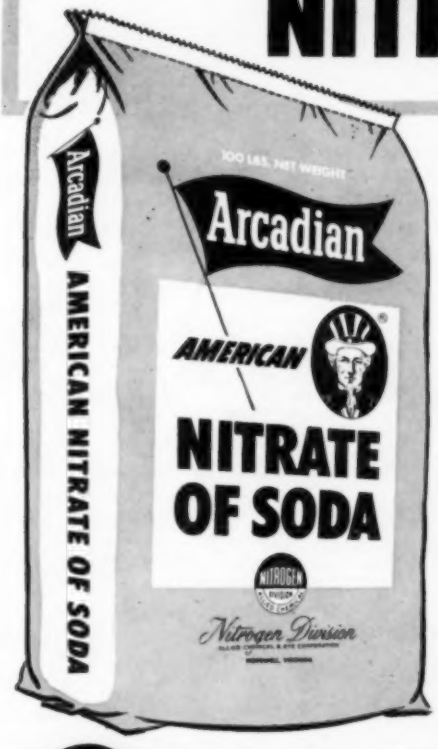
This advertisement is printed in one shade of molybdenum orange, a pigment widely used for its striking color and good coverage — ideal in paint for farm and field equipment.

MA 5-2

CLIMAX MOLYBDENUM



NEW STYLE AMERICAN NITRATE OF SODA



Best ever produced – New-process ARCADIAN® *American* Nitrate of Soda has the improved physical condition that puts it in the top rank for ready handling and easy spreading.

Big, triple-screened crystals as made by ARCADIAN give your customers all the advantages of 16% quick-acting nitrate nitrogen that is free-flowing in any method of application, and that holds physical condition better in storage. Also provides the benefits of 26% sodium content.

Check Your Stocks NOW!

—make sure you get enough of the improved ARCADIAN *American* Nitrate of Soda, best for you because it's best for your customers. See us now.

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Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

AA Quality...

for over 85 years a symbol of quality and reliability

From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock
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All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
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30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

DESTROY WEEDS

this low-cost thrifty way

POLYBOR-CHLORATE®
WEED KILLER
FOR SPRAY APPLICATION

here's the Weed Killer with effective **DOUBLE ACTION**

Polybor-Chlorate destroys weeds and grasses *on contact* and through *root action* . . . then residual action continues, to prevent regrowth. This is one weed killer than can destroy *all* vegetation quickly and easily when applied properly! Polybor-Chlorate is so highly soluble that continued agitation of spray equipment is unnecessary. This herbicide combines the effective plant-destroying powers of sodium borates and sodium chlorate; it is non fire-hazardous! Polybor-Chlorate is a labor saver and a money saver . . . one spraying may suffice to keep the treated area bare of growth for a year or more!

YOU CAN DESTROY ALL OF THESE WEEDS and GRASSES . . . EASILY

BINDWEED (Wild Morning-glory) ● QUACKGRASS ● CANADA THISTLE ● WHITETOP (Hoary Cress) ● ST. JOHNSWORT ● LEAFY SPURGE ● POISON OAK ● POISON IVY ● NUTGRASS ● BERMUDA GRASS ● JOHNSON GRASS ●
. . . and many, many others!

NO FIRE HAZARD

FAST-ACTING
APPLY WET OR DRY
ECONOMICAL
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PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED
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MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

Need Multiwall Bags FAST?

Fulton can ship stock sizes at once from all these plants:

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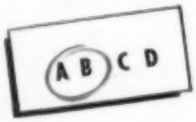
BURLAP FROM ONLY TOP-GRADED MILLS

Burlap mills are classified A, B, C, and D. Fulton buys *only* from AB mills, to be sure your finished bags are *never* made from burlap with hidden weakness.



Note: You can get regular burlap — and Ful-Brite, the brighter burlap — from Fulton. Ful-Brite is a prestige package for your premium products.

COTTON CONTROLLED FROM RAW MATERIAL TO FINISH

From the raw cotton to the finished bag, Fulton guards quality. Weight and weave of every fabric are tested to assure uniformity in all bags.

Automatic point-of-sale merchandising... Fulton's fashion prints can tip the scales in favor of YOUR brand when the consumer buys.

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These waterproof lined textile bags set up a protective barrier between your product and outside conditions. The inner sheets in Fulton WPPL bags are moisture resistant, and also prevent transfer of odors. Your choice of paper or polyethylene laminated to cotton or burlap.

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Knock out plant pests economically with

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Dust Concentrate

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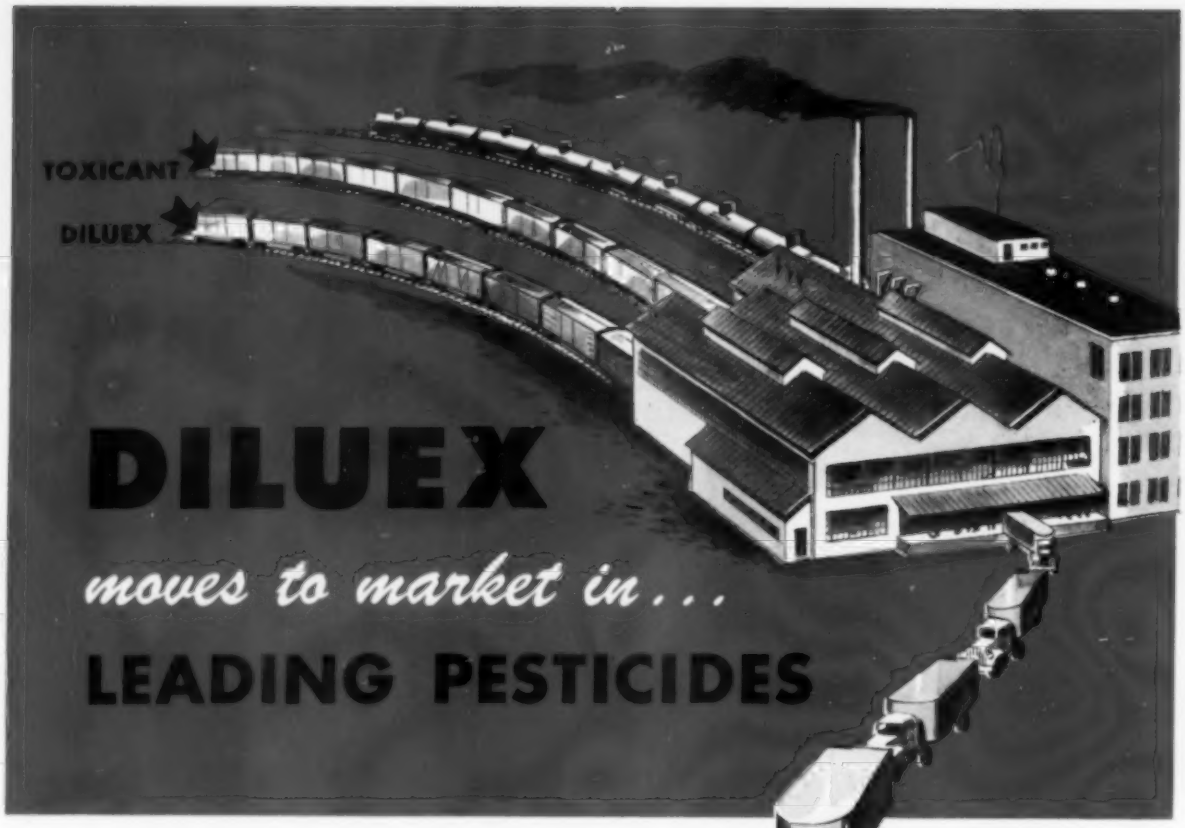

On the basis of technical study and practical experience, Floridin products, extracted and specially processed at Quincy and Jamieson, Florida, are coming into more and more general use in the agricultural chemical industry.

Are you impregnating toxaphene—chlordane—aldrin—parathion—any liquid toxicant?

Are you milling DDT, BHC, or other organics?

Formulating blended dusts?

For any of these processes, it will be worth your while to learn about DILUEX and DILUEX-A.

As grinding aids, adsorbent concentrate bases, and dust conditioners for the most exacting uses of the industry, Floridin products have won a leading place. The demand for DILUEX and DILUEX-A, increasing steadily for many years, has recently grown to multiplied tonnage. Production facilities have been enlarged accordingly, and shipments are being made without delay, by train and truck from two Floridin plants at Quincy and Jamieson, Florida. Correspondence is invited.

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Engineered

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NO two jobs are exactly alike—that's why Union Special builds a wide variety of bag closing equipment. In the Union Special line you will find machines for closing all sizes and kinds of bags from small textile or paper bags of one pound, or less, up to the largest multiwall paper bags in use today. Whether your production schedule calls for closing just a few bags or for high continuous output, Union Special can supply the equipment to do the work efficiently, economically, dependably!

Coupled with a complete line of equipment is Union Special's vast background of experience and technical know-how that insures customers of getting THE RIGHT MACHINE FOR THE JOB!

Union Special representatives located in all leading industrial centers are qualified by experience and training to give you expert recommendations. Take advantage of the service they offer.

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Send for Bulletin 200

CLASS 21800 (*left*) for fast, economical closing of paper bags. Illustrated is Style 21800 H with 5 Ft. conveyor and 80600 H sewing head for making tape bound closure. Tape is cut off automatically at each end of closure. Sewing head and conveyor adjustable vertically.

CLASS 20500 (*above*) machines are heavy duty, high production units for closing medium and heavy weight bags. Available with power-driven horizontal conveyor, inclined conveyor, or both; or with conveyor transmission unit only, for plant production line.

STYLE 20100 H (*left*), is a heavy duty, high production column type machine designed for use with plant conveyor systems. Sewing head is pedal controlled.

DUPLEX MACHINES (*right*) are designed for closing double bags. The first sewing head closes the inner bag; the second closes either the outer bag alone, or both bags together for extra safety. Also recommended for single closures where continuous operation is a must—operator can instantly switch to other head.

Union Special®

BAG CLOSING MACHINES

MORE PRODUCTION WITH LESS EFFORT!

USS Ammonium Sulphate

makes satisfied, repeat-order customers for nitrogen *-it's non-leaching*

Nitrogen used for *early* spring applications (and for fall and winter, too) should be non-leaching Ammonia nitrogen. Then, when the heavy spring rains come, little or none is lost through leaching. Assure your dealers of customer satisfaction—and repeat business—by using USS Ammonium Sulphate in your mixtures.

Stock your dealers <u>now</u> for bigger, earlier spring demand

All indications point to increased nitrogen sales this year . . . with the emphasis on *earlier* application this spring for earlier growth. Most states are pushing extensive pasture-improving programs that call for a lot more nitrogen. In addition, the efforts of agricultural authorities for increased usage of nitrogen are bearing fruit. Last year the sale of balanced ratio fertilizers—such as 10-10-10—showed greater percentage increase than other mixtures. The trend should be even stronger this year.

Order your supply of USS Ammonium Sulphate right away so that your dealers won't miss out on any of those early spring profits. You'll find free-flowing USS Ammonium Sulphate is an easy mixer and less corrosive than other nitrogen materials. It's available in bulk quantities for mixing and in strong, moistureproof bags for direct application sales. Contact our nearest Coal Chemical sales office or write direct to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

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S-406

UNITED STATES STEEL

Technical SECTION

Phosphatic Fertilizer from Blast Furnace Slag

FURTHER study of water granulated blast furnace slag, a by-product necessary in the production of steel that can be used profitably by agriculture as a liming material, was suggested recently.

Water granulated blast furnace slag is a basic material but is not what is known as "basic slag," marketed only in the south and a by-product in the manufacture of steel at the open hearth furnaces. The Association of Official Agricultural Chemists classifies this "basic slag" as a phosphatic fertilizer. It carries from 8 to 10 per cent of P_2O_5 and is not considered a liming material.

Water granulated blast furnace slag is a porous material mixed with minute glassy particles. Recent work by the Ohio Agricultural Experiment Station indicates superior values for the product over both air-cooled slag fines and limestones. European reports have given credit to blast furnace slag as a fertilizer. Minor elements included in the slag were discussed in a recent study on trace elements by the U. S. D. A., Beltsville, Md.

Investigation of slag beyond its liming value could involve the study of availability of calcium and magnesium to plants; minor element uptake by plants and residual values of secondary foods contained in water granulated blast furnace slag; value of soluble silica input and consequent effect on uptake of phosphorus and increases in the nutritional values of crops for human and animal consumption.

G. H. Doscher, 'Water Granulated Blast Furnace Slag and its Potential Effect on our Understanding of the Fundamentals of Soil Fertility," American Society of Agronomy, annual meeting, Nov., 9, 1954, St. Paul, Minn.

•

Mathieson Scrubbing Process

Substantial increases in capacity from existing contact sulphuric acid plants are reported with a 2-stage exit gas scrubbing process now being offered for licensing to other manufacturers by Olin Mathieson Chemical Corp., Baltimore.

Olin Mathieson has exclusive licensing rights in the United States to the process, developed originally by the Consolidated Mining and Smelting Company of Canada Ltd., and known as the Cominco SO_2 Recovery Process. A modification was developed by Olin Mathieson for use in its own operations.

Olin Mathieson has established a Western Sulphur & Acids Division at Little Rock, Arkansas, which will offer engineering consulting service or will undertake design, installation and initial operation of the process under contract to licensees.

The first system utilizing the Cominco process in the United States was put into operation more than a year ago by Olin Mathieson at its Pasadena, Texas, plant. There the 2-stage scrubber, using ammonium sulfite-bisulfite scrubbing solution, returns sulphur to the production unit and converts part of the acidic values in the exit gases to ammonium sulphate. Olin Mathieson pipes the ammonium sulphate to its fertilizer manufacturing operation, but the sulphate can also be recovered as crystals. The entire unit is automatically controlled and requires no additional personnel for its operation.

•

House Fly Control

Residual bait formulations of phosphorus compounds such as malathion, diazinon, chlorthion and experimental insecticide 4124 were sprayed on the interior of dairy barns to secure extended residual action against house flies. Best results were obtained with emulsions and suspensions of diazinon and experimental insecticide 4124, and with chlorthion emulsion when applied at the rate of 100 mg. of toxicant and 250 mg. of sugar per square foot. Malathion emulsions, although effective at dosages of 200 mg. of toxicant and 480 mg. of sugar per square foot, were not satisfactory as a single treatment of water wettable product. John W. Kilpatrick and H. F. Schoof, ESA, annual meeting, (Dec., 1954).

•

Labeling Rules on Aldrin

Based on the safe-use record established by aldrin and dieldrin, the Pesticides Regulation Section of the U. S. Department of Agriculture now permits lower hazard classifications for products containing these compounds. The lower hazard classifications permit milder warning and precautionary statements on product labels. Precautions for use are now similar to those recommended for other chlorinated hydrocarbon insecticides, i.e., adequate care should be taken to avoid swallowing, breathing dust and sprays, and contaminating the skin.

Products containing 10% through 59% aldrin or dieldrin, which include most commercial formulations, are now placed in a lower hazard category, which requires the mild signal word "Warning" on the label. Another relaxation is the substitution of the term "Hazardous" in the warning statement for "Poisonous." Aldrin and dieldrin products below 10%, which include most dust and granular formulations, may now be labeled with even milder statements, i.e., "Warning" may be replaced by the simple word, "Caution."

Soil Effect on Insecticides

Studies at the Connecticut Agricultural Experiment Station, New Haven, Conn., indicate that fine-textured soils hold more lindane and hold it longer than coarse ones. Sand is reported to retain practically no lindane, silt held moderate amounts, and clay retains more of the chemical than any other type tested. In fine-particled soils, the insecticide vaporizes more slowly, thus making it less available for insect-killing purposes and also making it remain in the soil for longer periods. This suggests that it may be necessary to use smaller amounts of insecticides like lindane in sandy soils than in soils of finer texture, because much less of the insecticide vapors would be adsorbed by the sand compared to the clay. It would also be expected that this sort of insecticide would produce greater residual effects in fine soils than in coarse-textured ones.

At the time these tests were started, lindane was the most promising new soil insecticide. It was prepared from crude benzene hexachloride, which caused off-flavor in some root crops. Recent tests have shown that lindane cannot be used safely as a soil treatment on all crops. The principles developed in these studies can be applied to chlordane, heptachlor, aldrin and other new soil insecticides which apparently do not taint root crops.

•

TSPP Cuts Drying Cost

Lower fuel cost, higher production rate, and a resultant product having high bulk density and good dispersion characteristics are advantages reported in a new spray drying technique by Minerals & Chemicals Corp. of America, at McIntyre, Ga.

A feed slurry containing aluminum silicate pigment at 60 per cent solids, compared to 25-30 per cent solids previously used, is effectively spray-dried if a dispersant, tetrasodium pyrophosphate, is used. TSPP turns high-solids content filter cake containing aluminum silicate into a free-flowing slurry.

Mined Kaolin is loaded to the mixing tank where water is added to form a slurry. After thickening, degritting, classification, bleaching and dewatering operations, the slurry is fed to a rotary vacuum filter, yielding a washed cake with 58-60 per cent solids. The cake is then passed to a mixing vat where TSPP is added at 0.2 per cent, based on solids content.

The process, offered under license, is covered by U. S. Patent 2, 540, 182. *Chemical Engineering*, p. 118, 120. Jan., 1955.

•

NH_3 Sulfate Aids Growth

Phillips Petroleum Co., Bartlesville, Okla., reports that it successfully grew Bermuda grass under drought conditions by applying ammonium sulfate at the rate of 100 lbs. per acre in an experiment at the company's Agricultural Demonstration Project near Foraker, Okla., during the 1954 season.

The grass received 3.6 inches of rain between January 1 and April 7, the date of sprigging, and only 1½.4 inches after the sprigging date. By mid-August limited summer grazing was available, and during late fall considerable additional grazing was provided.

•

Alkaline Earth Emulsifiers

Blended emulsifiers based on certain alkaline earth sulfonates, such as the calcium salts of alkyl benzene sulfonic acids are reported to synergize the action of many nonionic emulsifiers. Made commercially under the trade name "Toximuls" by Ninol Laboratories, Chicago, the emulsifiers may be used in quantities as low as two or three per cent and still produce emulsions of good stability. The product is designed especially for insecticide formulations and is compatible with toxaphene, DDT, aldrin, BHC, chlordane, dieldrin etc.

The manufacturer points out that spontaneity of emulsification in use with the major insecticides is one of the main advantages of the "Toximuls," and that creaming rates are low, giving emulsions of greater stability.

Fruit Fly Control in Hawaii

Tests conducted in Hawaii show that a poisoned-bait spray containing malathion and a hydrolyzed or partially hydrolyzed protein will give control of the oriental fruit fly (*Dacus dorsalis Hendel*) for 1 to 3 weeks. Fruit flies are attracted to the deposits by the protein material, which contains nutrients essential for their sexual development, and quickly ingest enough to kill. Contact action of the deposits and contamination of natural food sources also contribute to fly mortality.

Exceptionally good control of infestations in mangoes and guavas and of mixed infestations of this fly and the melon fly (*D. cucurbitae* Coq.) attacking passion fruit were obtained. Limited tests have shown that it is also very attractive and toxic to the Mediterranean fruit fly (*Ceratitis capitata* (Weid.)) and the melon fly.

The U. S. D. A. reports that these bait sprays have caused no injury to the fruit or foliage of passion fruit, mango, or guava, and are recommended for the protection of these fruits. Tests conducted on a wide variety of crops on the mainland and elsewhere have shown that the phytotoxicity of malathion is very low. Control with bait sprays is most effective when large areas are treated. L. F. Steiner, "Fruit Fly Control with Poisoned Bait Sprays in Hawaii," U. S. D. A. Bulln. Ars-33-3.

•

Caution on Potato Disinfectants

Maine growers and shippers of table stock potatoes, considering washing their product to improve marketability, should select a disinfectant with great care, according to a report by the Maine Agricultural Experiment Station. U. S. D. A. research workers advise that sodium hypochlorite solution, calcium hypochlorite solution, chlorinated water or acetic acid solution are satisfactory from the standpoint of the health of the consumer. However, food and drug authorities do *not* approve the use of hexamine, dithane, formaldehyde or antibiotics such as terramycin, streptomycin, aureomycin, etc. Copper and mercury compounds do not meet with official approval.

Stocks Need High Potassium

Potassium and nitrogen needs of stocks, floricultural crop of southern California, are high, results of a survey made in 1953 revealed.

Potassium deficient plantings observed with increasing frequency in recent years, may be due to inadequate fertilization, continual intensive cropping, adverse plant competition, or unbalanced nutrient levels resulting from irrigation waters or fertilization practices.

Average potassium content in lower leaf tissues of 35 plantings was 3.43 percent. Deficiency symptoms were observed on leaves with potassium contents as high as 1.5 percent. Four and five percent potassium in the tissues were common.

Extractable soil potassium measurement alone was not a good indicator of availability of potassium to the plant. Calcium, potassium or cation ratio provided much better information.

About three percent potassium in the dry leaf tissue is advocated as an optimum level for proper growth and flower production.

Estimated crop requirement of a stock planting for several macronutrient elements was: Nitrogen—369 lbs. per acre; phosphorus—25 lbs. per acre; potassium 323 lbs. per acre; calcium—200 lbs. per acre; and magnesium—26 lbs. per acre. G. A. Cahoon and D. O. Crummett, *Better Crops with Plant Food*, p. 13-16, Dec. 1954.

NEW BOOKS

Chemical Calculations, by Prof. H. V. Anderson. Sixth Edition. Published by McGraw-Hill Book Co, New York. 6 x 9 inches, cloth binding, 305 pages. $4.75.

Index XII to the Literature of American Economic Entomology, 321 pages. Compiled by Ina L. Hawes. 1954. Published by the Entomological Society of America, 1530 P Street, N. W., Washington 5, D. C. $3.00 postpaid.

This latest volume in a series which now appears annually covers the literature published in 1952. The book is bound in impregnated cloth and includes a frontispiece portrait of Miss Mabel Colcord (1872-1954) who compiled Volumes 2 to 6 of the series.

Instrumental Methods of Chemical Analysis, by Galen W. Ewing. Published by McGraw-Hill Book Co., New York. 6 x 9 inches, cloth binding, 434 pages, price $6.50.

Designed for students and technical personnel, the book covers methods of instrumental analysis. The author presents as much data on the operation of particular instruments as is consistent with a thorough presentation of theory. He first outlines the theoretical background, without the use of complex mathematics, and then describes the detailed analytical methods available, showing how they relate to the theory and to what types of actual situations they may be applied.

Auxins and Plant Growth, by A. Carl Leopold. Published by University of California Press, Berkeley and Los Angeles, Calif. 6 x 9½ inches, cloth binding, 354 pages, price $5.00.

Since it is the author's premise that productive applied research into plant physiology can be carried out only with a firm and broad understanding of the fundamental auxin processes, the book is addressed primarily to research workers in basic plant physiology. It is useful also to those doing research in the agricultural sciences, covering the use of auxins in agriculture and relating the basic processes to the functional effects on plants.

An Introduction to the Study of Insects by D. J. Borror and D. M. Delong. Published by Rinehart & Co., New York. 1030 pages, cloth binding, price $9.00.

This text includes a key to the major families of insects in the United States. Each key family includes a discussion on classification, biology and importance, illustrations, etc. In most cases, the commoner representatives of the species are fully described.

Japanese Beetle Treatment

Use of a miscible ethylene dibromide formulation in a Japanese beetle quarantine treatment has been approved on a restricted basis when only grubs are in the soil and with limitations as to soil temperature and moisture. Injected into the soil about the roots of plants after digging, it is reported to control Japanese beetle grubs.

In per cent by weight, ethylene dibromide, 2.5%, Tween 20, 2.5% and isopropyl alcohol, 95.0% (of 99% alcohol) are mixed to form a clear solution. Tween 20, a polyoxyalkylene derivative of sorbitan monolaurate, is a surface-active agent.

The formulation is miscible in most proportions with water, and diffuses in soil moisture from the point of injection. It provides three possible means of killing the grubs: direct contact with the liquid, ingestion, and fumigation.

The formulation is injected in 4-ml. portions at a depth of three inches from the top of the plant ball to provide a dosage equivalent to 0.4 gram of ethylene dibromide per square foot, based on the largest horizontal cross-sectional area of the ball.

R. D. Chisholm, L. Koblitsky, W. E. Fleming, E. H. Siegler, and W. W. Maines, Entomology Research Branch, U. S. D. A., "Preparation of Miscible Ethylene Dibromide for Use in Japanese Beetle Quarantine Treatment," Dec. 1954.

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Fruit Insect Studies

Work done at Fort Valley, Ga., shows aldrin to be highly effective for plum curculio control; dieldrin and heptachlor also give satisfactory results. Large and small plot spraying experiments for plum curculio control in the summer of 1954 included studies of concentrated sprays, persistence of residues, cage tests with new insecticides, residual value of new insecticides, phytocidal effect of insecticides on peach fruit and foliage and trunk sprays and fumigants for peach tree borer control. Oliver I. Snapp, Peach Insect Investigations at Fort Valley, Ga. during the summer of 1954.

We custom mix any combination of mineral mixtures to your own specifications. There's only one ingredient to add to your regular fertilizer for a completely balanced plant food. No additional labor or mixing facilities are required since Tennessee's custom-formulated mineral mixtures come to your plant in bulk or bag carefully mixed in controlled amounts of soluble, readily available forms of Copper, Zinc, Manganese, Iron, Boron, and Magnesium. Cut down on raw material cost, number of items purchased and handling time.

[illegible], specifications and detailed information on request.

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Sodium Effect in Crop Fertilization

SODIUM in the soil produces a marked increase in the yield and quality of numerous crops, according to a report released last month by Dr. Walter P. Mortensen formerly of the University of Wisconsin, now at the Western Washington Branch Experiment Station, Puyallup, Washington.

The Mortensen report, the result of research sponsored by the Salt Institute, Chicago, included findings involving crops grown on hundreds of Wisconsin soil types, in greenhouse and in field tests, and also included reports of crop yields on soils in various sections of the country, generally east of the Mississippi River.

Salt, approximately 40 per cent sodium and 60 percent chloride, was used as the sodium source. The work was divided into three groups: (1) crops responding to sodium fertilization when potassium is limited, (2) crops responding to sodium when potassium is ample, and (3) crops not responding to sodium regardless of the level of potassium.

In these experiments salt was used as a soil amendment, applied to the soil separately, similar to bulk spreading of lime, or mixed with prepared plant foods. Farmers can find out how much sodium is present by submitting soil samples to experiment stations. Many stations can advise the amount of salt needed to produce the required sodium level for crops which the farmer plans to grow. Salt is obtainable through farm supply dealers.

Sodium analyses of 671 soils in Wisconsin showed sands and sandy loam soils to contain 20 to 25 pounds per acre of sodium, while salt loam soils contained about twice as much. Yield increases due to sodium were found in sugar beets, oats, barley, and wheat. Other investigations reported in this work showed increases in yield due to sodium in the following crops: table beets, celery, flat turnips, radishes, rutabaga, buckwheat, rye, millet, hay, rape, cabbage, mangels, onions, carrots, potatoes, mangelwurzels, lettuce and chicory.

Other crops, such as asparagus, broccoli, corn, Brussels sprouts, parsley, parsnips, peppermint, spinach and tomatoes showed no marked benefit. But the Mortensen report pointed out that some of these crops might have responded to sodium slightly if fertilizing materials free of sodium had been used, or if grown on soils lower in available sodium content.

Major emphasis was given to experiments with celery, sugar beets, barley, wheat and oats. Dr. Mortensen employed 500 pounds of salt with either a 6-6-0 or 6-6-18 fertilizer per acre of sugar beets, and 200 to 300 pounds of salt per acre with 3-12-12 or 0-20-10 fertilizer for barley. Similar amounts of salt were used in the tests on other crops, according to the report which includes evaluation of the crops, soils, yields and quality of the crops produced under varying conditions.

Definite sugar beet yield responses to applied sodium were obtained. The greatest responses, 1.8 to 2.6 tons per acre, resulted when potassium was not also applied. Sodium application to the soil usually did not affect significantly the sugar content of beets, although the greatest amounts of sugar produced per acre occurred when sodium was applied.

In general, barley, oats and wheat responded to sodium fertilization, but the degree of response appeared governed by the potassium level, as well as the variety of the grain being treated. The average increase in yields from an applictaion of 300 pounds of sodium chloride per acre, were, in bushels per acre, 6.2 for barley, 2.4 for oats, and 3.3 for wheat. The quality of malt, produced from barley fertilized with sodium, was not greatly affected. Maximum yield of barley was obtained in water cultures where the ratio of sodium to potassium, equivalent basis, was three to one.

The sodium content of the crops varied with the crop grown and the amount of sodium or potassium applied. In the case of field experiments, sugar beets contained much larger quantities of sodium than the grains. Barley had slightly higher content of sodium than did the oats or the wheat. Sodium additions depressed potassium much more than calcium or magnesium absorption by the plants. Similarly, potassium additions depressed sodium absorption. The sodium contents of the straw were much higher than those of the grain and were decidely more affected by additions of sodium.

Dr. Mortensen's compilation contained references to some 48 other investigations carried out in the use of sodium chloride for soil purposes throughout sections of eastern United States.

The work was begun in 1950 and since then the soils department of the University of Wisconsin recommends to celery producers the application of from 300 to 800 pounds of salt per acre along with prescribed fertilizers, depending on particular soil conditions and plant food formulas. Taste and tenderness improvements along with increased yields are reported by commercial growers.

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Antibiotics in Disease Control

The antibiotic substances, helixins A, B, and C, crystalline antimycin A-35, and crude helixin were effective for controlling Victoria blight, smut of oats and wheat bunt, in tests recently completed in Wisconsin.

Separation of the helixins does not seem essential for seed treatment purposes, as helixins A and C provided control of Victoria blight, possessing about the same potency as helixin B, previously reported effective.

This work confirms recent studies that ethanol plays an important part in effectiveness of helixin B. Ethanol may serve to carry helixin B into the outer parts of the seed, since in other carriers it is effective for diseases incited by surface borne pathogens of wheat bunt and oat smut. Curt Leben, D. C. Army, and G. W. Keitt, *Phytopathology*, #12,704-707, (1954).

Experienced inspectors watch every phase of V-C's bag-making operation. Extra care in manufacturing has helped make V-C Bags famous for their toughness and stamina.

After "tubing," V-C Bags are rigidly inspected for proper seam pasting, length and size. Special care is taken to see that all surfaces are absolutely bonded.

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Rigid quality controls, top-grade bagging materials, and careful construction give V-C Multiwall Bags the ability to stand rough treatment. V-C Bags are available in various styles and sizes, two-to-six ply, expertly designed and printed to your specifications in one to four colors. Write for full information, or discuss your bag requirements with a V-C representative.

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INDUSTRY *Patents*

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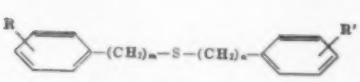
The data listed below is only a brief review of recently issued pertinent patents obtained by various U. S. Patent office registered attorneys for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommell by sending 50c for each copy desired. $1.00 for Canada. They will be pleased to give you free preliminary patent advice.

2,690,413. METHOD OF FUMIGATION WITH ACETYLATED HALOGENATED THIOPHENE. Patent issued Sept. 28, 1954 to Melvin J. Janes, Flower Hill, N. Y., and Duncan J. Crowley, Penns Grove, N. J., assignors to Socony-Vacuum Oil Company, Incorporated, a corporation of New York.

A method of killing insects and nematodes subject to destruction by fumigation, which comprises exposing the insects and nematodes to the vapors of an acetylated halogenated thiophene, otherwise unsubstituted, in a confined space, at ambient temperatures, and maintaining said vapors in said space for a period of time and at a concentration sufficient to kill said insects and nematodes.

2,695,224. PREVENTION OF PLANT GROWTH WITH ARYLIC SULFIDES. Patent issued Nov. 23, 1954, to Arthur H. Schlesinger, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis, a corporation of Delaware. The method of preventing plant growth which comprises applying to media normally supporting said growth a herbicidal composition comprising a sulfide having the formula



in which R and R' are selected from the class consisting of hydrogen and alkyl radicals of from 1 to 5 carbon atoms and *m* and *n* are numbers of from 0 to 2, said sulfide being present in said composition in a quantity which is toxic to plant life.

2,695,225. HERBICIDAL COMPOSITIONS. Patent issued Nov. 23, 1954, to Eugene D. Witman, Pittsburg, assignor to Columbia-Southern Chemical Corp., Allegheny County, Pa., a corporation of Delaware. A herbicidal composition comprising a herbicidal concentration of isopropyl N-3-chlorophenyl carbamate and a diluent therefore.

2,690,627. METHOD OF COMBATING AND PREVENTING OCCURRENCE OF VIRUS DISEASES IN PLANTS. Patent issued Oct. 5, 1954 to Viking Lennart Nyman, Marudd, Gronbacka, Helsingfors, Finland. Method of combatting plant virus disease and preventing the occurrence thereof in plans comprising treating the plants with protein free ethyl alcohol containing from about 3% to about 6% of croton aldehyde.

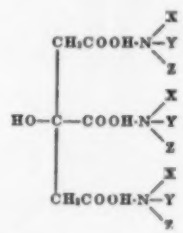
2,690,860. FERTILIZER DISTRIBUTOR. Patent issued Oct. 5, 1954 to George M. Kriegbaum, Homewood, Ill., and Clarence C. Haas, Richmond, Ind., assignors to International Harvester Co., New Jersey. In a distributor for fertilizer a hopper having an enlarged flange portion at its base including a top and a substantially cylindrical inner wall spaced radially from the said outer wall to define a peripheral tunnel open at the bottom, a rotatable plate at the base of the hopper forming the bottom thereof and of said tunnel, said inner wall having a circumferential opening formed therein adjacent said bottom plate to accommodate passage of fertilizer from the interior of the hopper to said tunnel, an arcuate gate concentric with the outer surface of said inner wall arranged to cover said opening, an adjusting member connected to said gate and extending through the top of said tunnel portion to move said gate circumferentially with respect to said opening to vary the amount of fertilizer discharged to the tunnel, and the bottom of said tunnel having an opening formed therein for discharging fertilizer therefrom.

2,690,965. HERBICIDAL COMPOSITION. Patent issued Oct. 5, 1954 to Robert Earl Emond, Mooretown, Ontario, and Francis Grant Moffat, Toronto, Ontario, Canada, assignors to Standard Oil Development Co., Delaware. A method of selectively eradicating weeds from transplanted celery plots which comprises distributing so as to effect contact with the weeds an aqueous emulsion of refined petroleum oil having a boiling point range of 300°—400°F., an aromatic content of from 6 to 24 volume per cent, and a naphthenic content of from 41 to 94 volume per cent, said emulsion containing an oil-soluble emulsifying agent which lowers the surface tension of water, the petroleum oil being present in an amount of about 60 to 30 volume per cent, the oil soluble emulsifying agent being present in an amount of about 1 to 5 volume per cent with the balance water and the aqueous emulsion being applied to the transplanted celery plot in an amount of about 20 to 100 gallons per acre.

2,692,822. METHOD OF TREATING PLANTS. Patent issued Oct. 26, 1954 to Frank Earl Denny, Yonkers, N. Y., assignor to Boyce Thompson Institute for Plant Research, Inc., New York. The method of retarding the growth of plants comprises treating the plant while in at least a partial dormant state with a compound of the group consisting of 2,4-dimethylquinoline, 2,3-dimethylquinoline, 2-chloroquinoline, 6-chloroquinoline, and p-ethoxyacetonanil in such concentration and that the growth of the plant is effectively retarded.

2,693,408. HERBICIDAL COMPOSITIONS. Patent issued Nov. 2, 1954, to John J. D'Amico, Charleston, W. Va., assignor to Monsanto Chemical Co., a corporation of Delaware. 1. The method of destroying vegetation which comprises applying to the foliage thereof a phytotoxic amount of a composition comprising as the essential active ingredient a 2-mercaptothiazolyl chloro olefin having at least one mercaptothiazolyl group and at least one chloro substituent attached to an open chain lower unsaturated hydrocarbon containing at least one double bond.

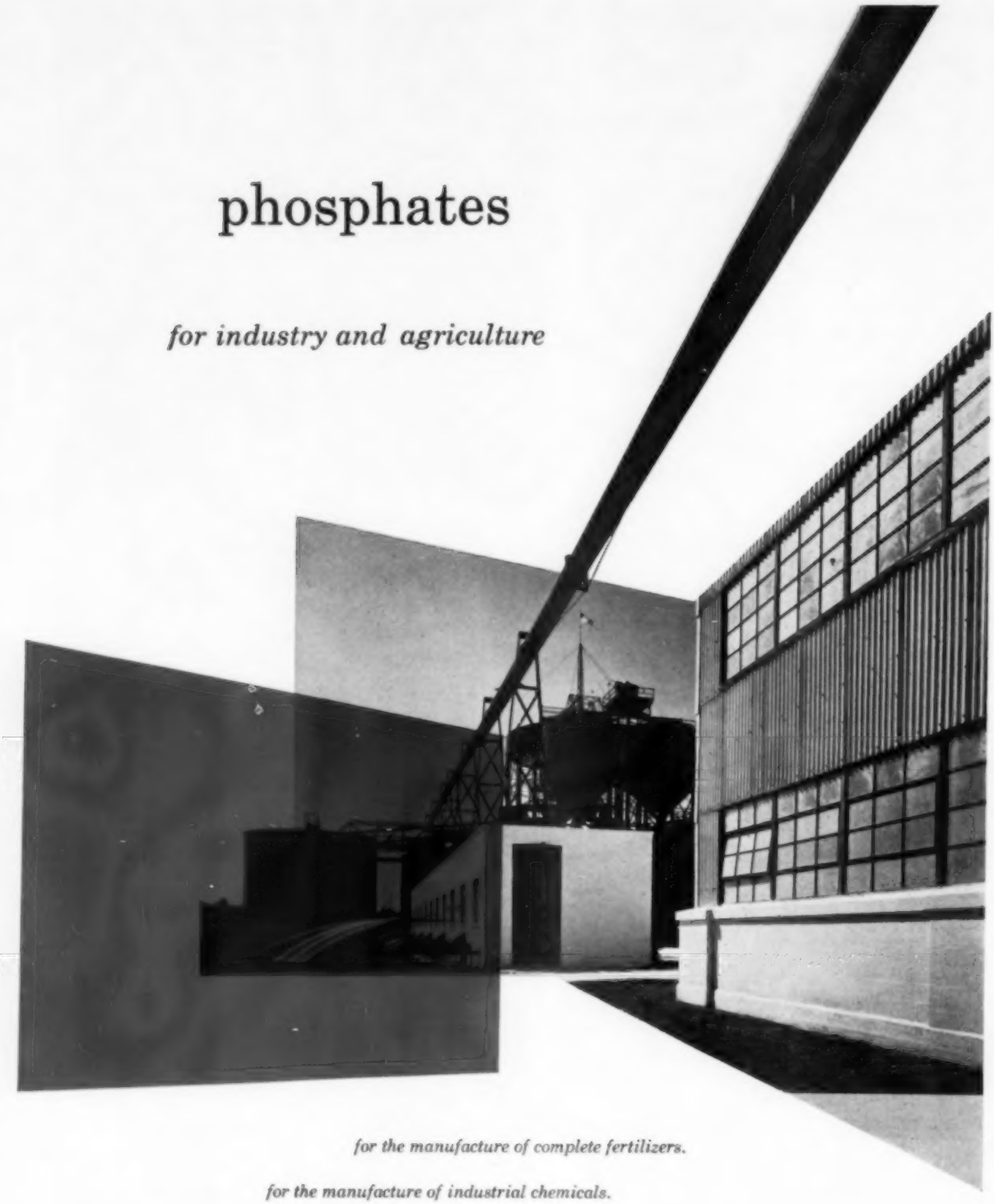
2,694,625. HERBICIDAL COMPOSITION. Patent issued Nov. 16, 1954, to John C. R. Warren, Elmira, Ont., Can., assignor, by mesne assignments, to Union Carbide & Carbon Corp., New York. 1. As a new composition of matter, a concentrated formulation of an organic amine salt of polychlorophenoxyacetic acid, said acid being present in amount equal to at least 20% by weight of said formulation, said formulation containing a tri-basic amine citrate having the formula



where X, Y and Z are each selected from the group consisting of hydrogen, lower alkyl and lower hydroxyalkyl, not more than two members of each series of X, Y and Z being hydrogen, said citrate being present in amount effective to prevent objectionable precipitation upon dissolution of said formulation in hard water.

phosphates

for industry and agriculture



for the manufacture of complete fertilizers.

for the manufacture of industrial chemicals.

ground rock phosphate for direct application to the soil.

phosphate minerals division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

GENERAL OFFICES: 20 NORTH WACKER DRIVE, CHICAGO 6 • Phosphate Mines and Plants in Florida at Noralyn, Peace Valley, Achan, Mulberry; in Tennessee at Mt. Pleasant and Wales • INTERNATIONAL produces phosphate, potash, complete fertilizers and feed phosphates for the American farmer.

INDUSTRY *News*

Bryant to Head Jefferson Chem.

George R. Bryant, vice president of the Texas Co. for the past four years has resigned his position to become president of Jefferson Chemical Co., a joint subsidiary of the American Cyanamid Co. and the Texas Co.

•

New Fertilizer Associations

A new National Association of Complete Liquid Fertilizer Manufacturers was formed recently with R. B. Ellsworth, Ellsworth Equipment Co., Indianapolis, Ind., as secretary. The NACLFM is not associated with any other group.

Another recently formed association, on which *Agricultural Chemicals* has no details other than the name, is the National Nitrogen Solutions Association.

•

Hudson to Expand Output

William Mayer, recently appointed president of the Hudson Pulp & Paper, Corp., N. Y. announced plans for substantial increases in production of multiwall shipping bags and other products. In connection with this program, the company has appointed Jacob Mayer, chairman of the board, Irwin A. Zuckerman vice president in charge of the consumer products division and Raymond J. Hatch, vice president in charge of research.

•

Marietta Reelects Officers

Executives of the Marietta Concrete Corp., Marietta, Ohio, were all reelected at the annual meeting of the corporation's directors and stockholders late last month. Frank O. Christy and F. Leonard Christy will continue as president and vice president, respectively.

The following branch appointments were confirmed: J. D. Ross, manager Baltimore plant; Robert D. Johnson, manager Nashville branch; and Vernon Gatewood, manager Hollywood, Fla. branch. The manager of the recently acquired Jamestown, N. J. branch is Robert Christy.

Ban Burlap in Potato Shipping

Long Island Potato growers recently voted to prohibit use of burlap bags in shipping potatoes as a step toward preventing further spread of golden nematodes. The action was taken at a meeting arranged by county agents, Howard H. Campbell and Walter Bean after complaints had been received from Connecticut processors that burlap bags might contain nematode infested soil.

Chemco of Iowa Joins Chemical Enterprises, Inc.

Chemco of Iowa, agricultural fertilizer concern with twelve affiliate companies located in western Iowa, has joined Chemical Enterprises, Inc., largest retail distributor of agricultural ammonia in the country, according to an announcement January 28 by Daniel B. Curll, Jr., president. The new acquisition raises the total of such distributing companies affiliated with Chemical Enterprises to fifty with approximately 300 distribution points and opens a new area not previously covered by the parent company or its affiliates.

The new affiliate, Chemco, which was acquired through an exchange of stock, will continue under the leadership of Tully W. Talbot as president and general manager and will operate with the same board of directors, officers and employees.

T. W. Talbot, president of Chemco, seated, pointing out Chemco installations to: Daniel B. Curll, Jr., president of Chemical Enterprises, Inc., left; and F. G. Breyer, chairman of the Board of Chemical Enterprises, Inc., and of Singmaster & Breyer, Inc.

Special Convention Issue

of

AGRICULTURAL CHEMICALS

to be brought out at the
annual spring meeting of the

NATIONAL AGRICULTURAL CHEMICALS ASSN.

being held March 7-9 at the
Chase & Park Plaza Hotel, St. Louis

With the opening of another growing season just around the corner, why not get under way with your plans to share in a bigger way in this market during 1955? A special advertisement in the March issue of AGRICULTURAL CHEMICALS can bring your sales message to the attention of top executives in the industry as they put the final touches on their own marketing plans for the coming season.

Write or Phone for Advertising Rates

AGRICULTURAL CHEMICALS

Box 31 **Caldwell, N. J.**

NFA-APFC Meeting June 12th

The American Plant Food Council and the National Fertilizer Association announced recently that the first meeting of the National Plant Food Institute, which is a consolidation of the two associations (*Agricultural* Chemicals Pg. 91, Dec., 1954) will be held June 12-June 15th at the Greenbrier Hotel, White Sulphur Springs, W. Va. Arrangements will be carried out jointly by the APFC and the NFA.

Mr. Paul Truitt, president of the APFC will arrange for room reservations, registration and publicity. Dr. Russell Coleman, president of the NFA, will arrange and be responsible for the program, convention committees, dinner and entertainment.

The associations announce that all organizations and individuals eligible for membership in the National Plant Food Institute, who are now members of the APFC and the NFA and intend to remain in the National Plant Food Institute effective July 1, 1955, will have until April 1st to put in their requests for primary consideration on hotel accomodations.

•

Ellis Builds Insecticide Plant

Wilbur Ellis Co., recently started construction of an insecticide plant at Seattle, Wash. The new plant is expected to be in production during the coming season, producing blended dusts and spray concentrates. Wilbur Ellis now manufacturers fertilizers at Seattle.

•

Garden Supply Trade Show

The 12th National Garden Supply Trade Show was scheduled for Feb. 1-3 at the 69th and 71st Infantry Regiment Armories, New York City. According to the advance program, the opening address was to be delivered by Arno H. Johnson, vice president and director of research at the J. Walter Thompson Co., New York.

The annual show features a large display of garden and pet supplies. For 1955, directors of the show planned to have 400 booths featuring new merchandise offered by manufacturers in their 1955 lines. Discussion panels were scheduled to be held during the second day. The March issue of *Agricultural Chemicals* will present a complete report of the 1955 show.

•

Carbide Names

New territorial assignments of four Crag agricultural chemicals sales representatives have been announced by Carbide and Carbon Chemicals Co., a Division of Union Carbide and Carbon Corp., New York.

M. J. Siciliano is transferred to the Chicago district office and is assigned to the central United States. J. R. Wheatly is assigned to the southeastern United States; R. R. Kessler is assigned to the eastern seaboard from New York to South Carolina; and R. E. McKenzie to New England and New York State. (l to r): R. McKenzie, M. Siciliano, J. Wheatley and R. Kessler.

Pennsalt Buys Interest in Index

The Pennsylvania Salt Manufacturing Co. has acquired a major interest in the Index Chemical Co., Houston, manufacturers of synthetic ethyl and methyl mercaptans. Index also produces dimethyl and diethyl sulfides, which are used principally as gas odorants and as intermediates for agricultural chemicals, animal feed supplements etc.

Index activities will be integrated with the production and sales departments of Sharples Chemicals Inc., a Pennsalt subsidiary, producer of related synthetic organic sulfur compounds.

Joining John T. Files and C. A. Dickey of Houston on the Index board are L. H. Clark, H. F. Bjork, Dr. H. I. Cramer, and R. W. Sloan of Sharples; and G. T. Collins, of the Pennsylvania Salt Manufacturing Co.

•

Fert. Plant in Iowa

The American Nitrogen Corp. Huntington, W. Va., is building a fertilizer plant at Dakota City, Iowa. The plant will produce fertilizers in solution form: nitrogen for injection into the soil and a complete fertilizer to be sprayed on top of the soil. Harold Miller, Tekamah, Neb., will manage the plant.

New USI Ammonia Plant

U. S. Industrial Chemicals Co. a division of National Distillers Products Corp., dedicated a $7 million plant for production of ammonia and fertilizer nitrogen compounds at Tuscola, Ill. on January 21st. The new plant has a production capacity of 50,000 tons per year of anhydrous ammonia and uses by-product hydrogen from the neighboring Petro plant in the NH_3 manufacturing process.

Present at the dedication ceremonies were J. E. Bierwith, president of National Distillers Products Corp.; R. E. Hulse, vice president and director of the chemical divisions; R. Coppedge, vice president; L. A. Keane, vice president, U.S.I.; K. D. Jacob, USDA; and other representatives of government and industry.

•

Natrin for Weeds in Tomatoes

A recent report by Professor R. D. Sweet, Cornell University, Ithaca, N. Y., points out that Natrin effectively controls weeds in tomato plants, by killing germinating weed seeds. The chemical might be available in small lots this coming season and will probably cost about $10 to treat an acre.

•

Am. Potash Moves Office

The New York offices of American Potash & Chemical Corp. were recently moved to 99 Park Avenue. American Potash had been at the Chanin Building, 122 East 42nd St., for over eleven years.

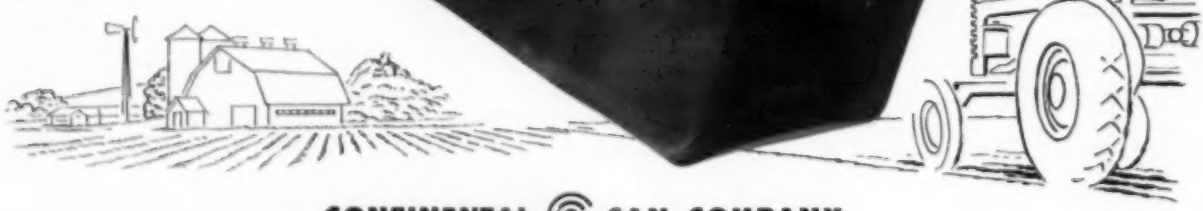
Add a selling feature to your insecticide with sift-proof

DUOTITE BAGS

You'll give your customers 100% value, your salesmen something to shout about when you pack your insecticide in Duotite bags. The exclusive Shellmar-Betner Duotite feature is a double-folded and heat-sealed bottom, which combined with liners, give positive assurance that your product won't sift. The top can be double-folded and heat-sealed, too; and there is reasonably-priced machinery available for this purpose. Add to sift-tightness the eye-appeal of clean, crisp color-printing by Shellmar-Betner craftsmen; and you have a package that will really build sales.

This is only one of many different packages that Shellmar-Betner now makes for chemical products. If you'd like better flexible packaging for your product, check with Shellmar-Betner.

SIFT-PROOF—
Specially lined and sealed. Duotite bags give double protection against sifting. Customers get full measure of quality.



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Diammonium Phosphate Production for Fertilizer

SUCCESSFUL changeover in the coke oven plant of the Colorado Fuel and Iron Corporation to permit the large scale production of diammonium phosphate for high analysis fertilizer was completed recently. Production of diammonium phosphate, to be marketed by the company under the trade name of "DAP," will take the place of ammonium sulfate, the conventional by-product of the coke oven operation.

Only relatively minor changes had to be made in the production facilities to accomplish the change, J. D. Price plant superintendent reported. The new product, which as a fertilizer has a 21-53-0 analysis, is readily water soluble, or it can be applied in dry form. Instead of removing the ammonia from the cake oven gases by scrubbing through sulfuric acid, CF&I has substituted electric furnace phosphoric acid. The practicability of the new method was proven in a full scale plant production test during the summer of 1954.

Immediately following the successful test, the company began making plans for permanent changes in the production facilities. Technical collaboration with personnel from Monsanto Chemical Company, world's largest producer of electric furnace phosphorus, and Koppers Company, Inc., builders of the CF&I coke ovens and saturators, was a material aid in the plant test and in bringing about the rapid changeover of the system.

Principal physical changes in the CF&I by-product plant made necessary by the changeover have been in the acid handling and storage facilities. Two new 3/16" Neoprene lined tanks, each with a capacity of 20,000 gallons, provide adequate storage for the acid received in tank car quantities from Monsanto. Most of the piping carying the acid to the proper points of the operation has been of plastic. A constant level feed tank, of stainless steel, has simplified the supply of the acid to the mother liquor in the saturators.

Most of the other changes brought about by the new product have had to do with matters of control, Mr. Price said.

"With ammonium sulfate, factors such as acidity, specific gravity, and temperatures of the bath, may vary widely. With the use of phosphoric acid, the matter of control to get the proper salt crystallization is more critical.

"The degree of acidity must be controlled in a fairly narrow pH range, slightly on the acid side. Ammonia losses were held to a minimum by a few changes in the saturator section."

In addition to the control of the degree of acidity, Mr. Price listed specific gravity, temperature of bath, water content, and the humidity of the gas as control factors to which special attention was paid.

CF&I operating personnel also have had to make some changes in the drying of the finished "DAP," but they have found the problem easier than with ammonium sulfate. The lack of hydroscopicity reduces caking during storage, and in addition, "DAP" does not require washing or neutralization during dryng.★★

J. O. Donaldson, general foreman by-products, P. Yarnell, assistant superintendent coke plant, and C. K. Pearson, benzol foreman, examine "DAP" as it comes out of the centrifugal drier.

•

CSC-VC Dispute Settled

The lawsuit between Chemical Construction Corp. and Virginia-Carolina Chemical Corp. has been settled to the satisfaction of both parties, it was announced late last month by the two companies.

The suit, filed last February by Chemico, involves a dispute concerning contracts under which Chemico was to design and construct for Virginia-Carolina at Nichols, Florida, a triple superphosphate plant, a sulfur-burning contact sulfuric acid plant, and facilities for the recovery of uranium from phosphate rock.

According to the joint announcement, the plants are now in commercial production.

•

False Advertising Charge

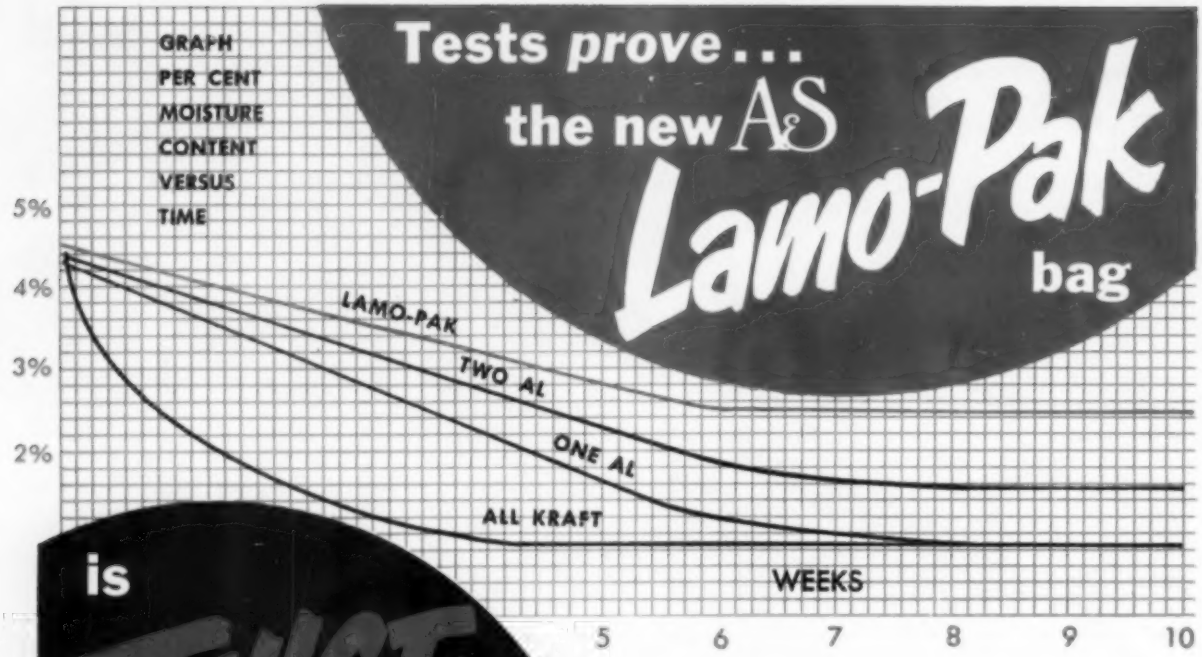
An FTC complaint against Foreign Products Corp., New York and G. Dugdale, trading as Burkleigh Co. of Towson charges false advertisement in the sale of "Actumus," a product imported from England. The FTC complaint says that "Actumus" will not remove weeds readily and easily and does not build or create any productive power of the soil. In addition, the complaint charges that one pound of "Actumus" is not equal to half a ton of manure or as effective as 16 tons of compost, as claimed.

•

Nitrate Blast in Fla.

Damage estimated at more than a million dollars resulted in a fire, January 28th, at a warehouse filled with nitrate of soda and owned by Louisville & Nashville Railroad, Pensacola, Fla. About twenty five boxcars were destroyed by the fire. The explosion occurred in boxcars being loaded with nitrate.

Tests *prove*... the new A&S Lamo-Pak bag



is TWICE as effective a moisture barrier!

and LAMO-PAK costs 10% less than double-asphalt-laminated kraft!

Photograph shows how product packaged with LAMO-PAK retains original moisture content and does not cake up. Note how caking of product due to excessive moisture-loss results from packaging with double-asphalt-laminated kraft.

■ Impressive tests recently run by independent laboratory show that the new Arkell and Smiths LAMO-PAK moisture barrier sheet is up to 50% more effective in retaining moisture content—and equally effective with hygroscopic products in keeping moisture out!

LAMO-PAK has plus values over both a single ply and two plies of asphalt laminated paper!

LAMO-PAK — a newly developed laminate sandwiched between two sheets of lightweight kraft — will protect products negatively affected by moisture changes. LAMO-PAK has these *plus* advantages over asphalt laminated kraft:

- ★ economical!
- ★ less paper stiffness!
- ★ up to 50% greater moisture protection!
- ★ easier closure operation!

A & S — backed by close to a century of manufacturing "know-how" — inspires confidence as it spearheads the search for valuable new packaging materials. ARKELL & SMITHS means top-flight designing, quality printing, laboratory-controlled production ... guaranteed every time!

ARKELL and SMITHS

For additional information on A & S Lamo-Pak, write to Arkell and Smiths, Packaging Division, Canajoharie, New York

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SALES OFFICES IN ALL PRINCIPAL CITIES

Tour of Pfizer Research Farm

Seventy - five members of the Chemical Commercial Development and the Chemical Market Research associations, on their way to a two-day meeting in Chicago, stopped at Terre Haute, Indiana, to tour the Pfizer Agricultural Research and Development Farm.

Dr. J. H. Kane, Pfizer vice president, reviewed the background of Pfizer research at a luncheon for the visiting group. Dr. Herbert G. Luther, director of the Pfizer Farm, and J. J. Thompson, manager of Pfizer's agricultural sales division, also spoke at the luncheon.

Soils & Fert. Conf. Feb. 10-11

A. E. Darlow, dean of agriculture and vice president of Oklahoma A. & M. College, will deliver the opening address at the tenth annual Oklahoma Crops, Soils and Fertilizer Conference, Feb. 10-11, at Oklahoma A. & M., Stillwater, Okla. The first session will be presided over by H. F. Murphy, and will feature a series of reports, including a review of weed and brush control by W. C. Elder and Harry M. Elwell.

"Agronomic Problems in Eastern Oklahoma" will be discussed by Wesley Chaffin during the afternoon session. Later, James S. Brooks will present the results of the corn improvement research program as part of a symposium on experimental results and recommendations for corn.

The second day of the conference will interest those concerned primarily with agricultural chemicals. Particularly relevant to the field will be "Biology and Control of Mites Attacking Small Grains" by C. F. Henderson; "Fertilizer Tests with Cotton for 1954" by L. W. Reed; and "Effect of Legume Rotations, Nitrogen Fertilizers, and Natural Fertility on Wheat Production" by H. J. Harper, agricultural director, Samuel Roberts Noble Foundation.

The fertilizer recommendations for Oklahoma will be presented in four separate reports: "Soil Fertility Factors that Determine Fertilizer Recommendations," J. Q. Lynd; "Soil Test Results and Fertilizer Recommendations," R. M. Reed; "Fertilizer Recommendations in the Conservation Program," W. E. Baumann; and "County Soil Testing Program in Oklahoma," R. O. Woodward.

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NAC Moves Headquarters

The National Agricultural Chemicals Association has moved its offices, effective Feb. 1, to Associations Bldg., Suite 603-604, 1145 19th Street, N. W., Washington 6, D. C. The telephone number remains STerling 3-2833.

•

Potash Institute Names Nelson

Werner L. Nelson, formerly with North Carolina State College, was recently appointed Midwest manager of the American Potash Institute. Dr. Nelson succeeds Dr. G. N. Hoffer who retired from this post January 1st, but will remain active as a consultant.

•

Potash Dumping Hearings

The first hearing under the new anti-dumping law to see whether imports of muriate of potash from the Soviet Zone of Germany are hurting domestic producers were opened late last month.

The hearings are being conducted as the second step of an investigation started by the Treasury Department. The Tariff Commission, which is holding the hearings, must notify the Treasury of its decision in the case by February 26th.

USDA Rules for Certification

Regulations governing certification of USDA of the usefulness of pesticide chemicals, as authorized under Public Law 518 (the Miller Bill), have been issued, the U. S. Department of Agriculture announced January 24th.

Except for minor clarifying changes, these regulations are the same as those originally proposed by the Department last November 24. They will appear as Part 363, Title 7, Code of Federal Regulations, and will become effective 30 days after their publication.

They provide for filing with the Secretary a copy of this petition and a request to certify to DHEW that the pesticide chemical is useful for its intended purpose.

The regulations issued by the Department of Agriculture govern the certification procedures to be followed in connection with filing petition with the Secretary of Agriculture to comply with law 518. The regulations provide:

(a) That requests for certification will be made in writing to the Chief, Plant Pest Control Branch, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C. Certification should be asked for only on pesticides that have been registered, or submitted to USDA for registration, as economic poisons under the Federal Insecticide, Fungicide, and Rodenticide Act. Requests for certification must be accompanied by a copy of the petition for tolerance filed with the Secretary, HEW.

(b) Requests for certification must be supported by reports of all experimental work done to determine the effectiveness and usefulness of the pesticide.

(c) If for any reason certification is not justified in all respects, the applicant will be so informed. He can then file a request with USDA for (i) certification to the extent proposed by USDA, (ii) a hearing on the proposed certification or the parts objected to, (iii) both such certification and a hearing, or (iv) withdrawal of the request for certification.

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and no wonder... as more and more uses are found for these two top insecticides!

IN AN AMAZINGLY short time the sales of aldrin and dieldrin have skyrocketed. There's a good reason! Both of these powerful insecticides are already approved as top controls of many kinds of crop pests . . . and constant research keeps uncovering more and more uses all the time.

The ever-growing list of approvals for aldrin and dieldrin means greater sales opportunity for you . . . a year-round market and profitable turnover.

aldrin controls such soil pests as:

- rootworms
- wireworms
- white grubs
- green June beetle larvae
- European chafer grubs
- sugar beet maggots
- Japanese beetle larvae
- onion and cabbage maggots

aldrin controls these pests above the ground:

- boll weevils
- fleahoppers
- rapid and tarnished plant bugs
- thrips
- cutworms
- grasshoppers
- stink bugs
- alfalfa weevil larvae
- fall armyworms . . . and others

An aldrin seed treatment controls these pests:

- seed corn maggots
- wireworms
- sugar beet maggots

And aldrin plus DDT is recognized as a top control for bollworms.

-dieldrin

go UP and UP!

Long-lasting dieldrin controls such pests as these:

Cotton pests
- boll weevils
- thrips
- cutworms
- fleahoppers
- and others

Turf insects
- Japanese beetle grubs
- ants
- white grubs
- lawn chinch bugs
- sow bugs and others

Public Health pests
- houseflies
- mosquitoes
- fleas
- ticks
- cockroaches and others

Vegetable pests
- tuber flea beetles
- leaf miners
- onion thrips
- root maggots
- sweet potato weevils and others

Fruit pests
- plum curculio
- lygus bugs
- stink bugs and others

Cereal and forage crop pests
- armyworms
- alfalfa weevils
- chinch bugs
- pale western cutworms

Seed Treatment
- true wireworms
- false wireworms
- seed corn maggots

To help you formulate aldrin and dieldrin, Shell provides the finest in technical service . . . and field representatives who work with growers, county agents and extension entomologists. Also, powerful advertising, *at the right time*, helps you make sales. Write for the very latest in technical information on these two outstanding insecticides.

LATEST! dieldrin . . . *for household pests!*

Now . . . dieldrin is approved and available to formulators for private-brand packaging to the great home market. Dieldrin is recommended for the control of roaches, silver fish, carpet beetles, ants, ticks, and wasps. Take advantage of this new profit opportunity.

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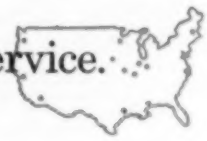
Here's Why Bemis is Your Best Multiwall Paper Bag Source...

Since 1858, Bemis has SPECIALIZED in making Bags. Bemis buys tremendous quantities of kraft paper and so can get the "pick of the crop." Bemis laboratories are the watch dogs of paper quality. Bemis engineers work constantly on new and better bags for diversified products. Bemis' twelve multiwall plants are strategically located to give unexcelled service.



Bemis

General Offices — St. Louis 2, Mo.
Sales Offices in Principal Cities

Am. Cyanamid Appoints Little

H. C. Little was appointed assistant general manager of the Agcultural Chemicals Division of American Cyanamid Co., New York, in an announcement late last month. He succeeds Horace V. Cory, who retired recently after 32 years service with the company.

Mr. Little, who joined Cyanamid in 1929 as a member of the legal staff, was previously assistant to the president and director of employee and public relations. His home is in Darien, Connecticut.

•

Renew Sanitation Program

The Department of Health, Education and Welfare announced last month an immediate resumption by the Food and Drug Administration of the grain sanitation enforcement program. The program empowers the FDA to declare a shipment of grain as unfit for human consumption whenever such action is necessary.

It is anticipated that under threat of substantial dollar losses farmers and other members of the grain industry will take active rodent control measures, as well as a stepped up program on insecticides and fumigants.

•

Fulton Names V. P.'s

Two new vice-presidents were named and four directors were elected to the board last month by Fulton Bag & Cotton Mills. The vice-presidents are Fred G. Barnet, manager of Fulton's Dallas, Texas plant, and E. Monroe Hornsby, manager of the New York office. The directors include Robert O. Arnold, Covington, Ga.; Herbert R. Elsas, Atlanta; William E. Mitchell, Atlanta; and James D. Robinson, Jr., Atlanta.

Elsas succeeds the late Hon. John M. Slaton, ex-governor of Georgia, while Arnold, Mitchell and Robinson assume newly created positions on the board. All other directors and officers were re-elected.

•

H. V. Cory Retires

Horace V. Cory has ended a 32 year sales career with American Cyanamid Co., New York, with the announcement last month of his retirement as assistant general manager of the agricultural chemicals division. Mr. Cory, a resident of New Jersey, will remain available to the company as a consultant.

•

V. Weyl Resigns NAC Post

Val E. Weyl, editor of the official publication of the National Agricultural Chemicals Association announced his resignation early last month. Mr. Weyl said he will shortly have completed four years of service with the Association, performing duties pertaining to publicity. As an entomologist, Weyl served with two divisions of the former Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture and with the Agricultural Chemicals Division of The Sherwin Williams Company, Cleveland, Ohio. He said that his headquarters for the immediate future will be at 6611 Willston Place, Falls Church, Virginia.

•

New Penn Salt Plant in Ohio

The Pennsylvania Salt Manufacturing Co., Philadelphia, announced last last month the opening of a new plant at Delaware, Ohio which is a component of the company's Chemical Specialties Division. A similar installation nearing completion at Chicago Heights, Illinois, will be dedicated February 10.

These plants will serve as blending, packaging and warehousing centers for Pennsalt's growing specialties markets in the east-central area. Included among the products produced in the new Pennsalt plants are the Knox-Out line of insecticides.

•

New Phelps-Dodge Warehouse

Phelps Dodge Refining Corporation, New York, has opened a warehouse in Chicago where stocks of all grades of Triangle Brand copper sulfate and nickel sulfate will be available for truck pickup. This will be Phelp Dodge's third shipping point, the other two being El Paso, Texas, and Laurel Hill, Long Island.

The address of the new warehouse is 5310 West Sixty-Sixth Street, Chicago.

Mackwin Names Billings

E. M. Billings was recently appointed central states sales supervisor for the Mackwin Co., Winona, Minn. Mr. Billings will headquarter in Ankenu, Iowa; and serve customers in Missouri, Kansas, Nebraska, Iowa and southeastern South Dakota.

•

Retired Bemis Mgr. Dies

E. B. Roberts, manager of the Peoria paper mill and multiwall bag plant of Bemis Bros. Bag Co. until his retirement in 1949, died January 9 following an extended period of illness. Mr. Roberts supervised the building of the Bemis-Peoria plant during 1912-1913 and remained there as manager for 35 years.

•

Plant Food Group to Meet

The Pacific Northwest Plant Food Association plans to hold its annual regional fertilizer conference June 28-30 at the Boise Hotel, Boise, Idaho. C. G. Painter, Idaho extension agronomist, Boise, will be general chairman. The annual convention of the association will be held Nov. 2 and 3 at Pilot Butte Inn., Bend, Ore.

•

U. S.-Canadian Potash Deal

A $15 million dollar deal between Western Potash Corp., Sask., Canada, and an unidentified American firm is reported nearing completion.

Under the proposed contract the American firm would cooperate with Western Potash in processing 1000 tons of potash daily at Unity, Sask.

Heads of the two firms were said to be working out details of the contract in negotiations at Winnipeg.

•

St. Regis Plant Opens

St. Regis Paper Co., New York City, recently announced commencement of production at its new multiwall paper bag manufacturing plant at Franklin, Va. The plant will employ some 400 people with an annual payroll of $1,500,000. Facilities include approximately 152,000 square feet of space, with four bag manufacturing lines.

Books and other Aids...

Handbook of Agricultural Pest Control

by S. F. Bailey and L. M. Smith

190 pages, 3.25 in U.S.A.

A practical handbook for the custom spray operator, the pest control operator, farm advisor, agricultural chemical salesman and field worker. This handbook covers the agricultural chemicals (insecticides, fungicides, herbicides, plant hormones and nutrient sprays, defoliants, etc.), their rates of application, useful formulas, as well as chapters on fumigation, spray machines, toxicology, dusts and dusting, aircraft, and mosquito control.

The book is pocket sized (5 x 7½ x ½ inches), bound with a flexible leatheroid cover, for convenient, practical use. It includes more than 100 tables for practical everyday use. Conversion formulas and examples illustrate application to specific uses.

Insect Control by Chemicals

by A. W. A. Brown

817 pages, price $12.50

817 pages. This text traces the relation between molecular structure and toxicity; classifies the insecticides and gives their chemical, physical properties; discusses the hazards to avoid in formulation, mixing and use of compounds; and illustrates modern application equipment, including nozzles; sprayers, blowers, etc;

The Chemistry and Action of Insecticides

by H. E. Shepard

504 pages, price $7.00

This new book gives a vast wealth of information on insecticides—their chemical, physical, and toxicological aspects. Helps the chemist determine their important applications and their effects upon insects. Gives history, commercial importance, major uses.

Covers these chemical groups: Arsenical Compounds; Fluorine Compounds, Sulphur Compounds; Copper Compounds; Inorganic Substances; Nicotine; Rotenone; Petroleum, Soaps, Creosotes; Synthetic Organic Insecticides. —

Destructive and Useful Insects Their Habits and Control

by C. L. Metcalf and W. P. Flint

1071 pages, price $10.00

This authoritative guidebook covers hundreds of both useful and destructive insects—treating the inner and outer structure and form of general species—explaining their eating and breeding patterns, and life cycles—telling you how to recognize them in any stage of development.

Here are descriptions of more than 500 types of insect pests of the U. S. and Southern Canada. The insects are grouped in accordance with the crops, animals, or products they attack. For each insect you are given recognition marks and types of injury it does to man—enabling you to determine exactly *what* insect is damaging your crop, and supplying you with the most effective means of dealing with it.

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H. C. Young

Cotton States Branch ESA Elects H. C. Young President at 29th Annual Meeting Jan. 17-19th At Hotel Tampa Terrace, Tampa, Florida.

THE Florida Entomological Society was host to the 29th annual meeting of the Cotton States Branch of the Entomological Society of America, held at the Hotel Tampa Terrace, Tampa, Fla., Jan. 17-19.

Over 200 members and visitors registered for the meeting, which was presided over by chairman W. G. Bruce, U.S.D.A., Washington, D. C. Dr. C. M. Beckham, entomologist, Agricultural Experiment Station, Experiment, Georgia, was chairman of the program committee. The chairman of local committee on arrangements was Herman S. Mayeux, Florida Agricultural Supply Co., Jacksonville, Florida.

A highlight of the 3-day session was the election of officers in which H. C. Young, U.S.D.A., Entomology Research Branch, Florala, Alabama, was named chairman to succeed W. G. Bruce, Washington, D. C. Dr. A. N. Tissot, Florida Agricultural Experiment Station, Gainesville, succeeds Dr. J. G. Watts, Blacksville, S. C. as vice chairman and Dr. W. G. Eden, Alabama Agricultural Experiment Station, Auburn, Ala. was re-elected secretary-treasurer.

Chairman W.G. Bruce in his annual address to the Branch challenged the profession to give added attention to the following three lines of endeavor: (1) the integration of entomology with the related sciences, (2) filling the gap between research and extension, and (3) an intensified educational program.

Dr. George C. Decker of Urbana, Ill., president of the Entomological Society of America, discussed the activities and needs of the National Society in which he stressed the importance of increased membership and increased participation by all members in the activities of the Society. Dr. J. Wayne Reitz, University of Florida, Gainesville, addressed the Branch on the growth and development of Florida agriculture in which he stressed the complexity of its entomological problems.

The Miller Amendment and what it means to entomology research was discussed by Dr. C. H. Hoffman and J. T. Coyne, Entomology Research Branch, U.S.D.A., Beltsville, Maryland. The proposed residues were explained and the responsibility of the various entomological interests pointed out. Mr. L. S. Hitchner, executive secretary, National Agricultural Chemicals Association, Washington, D. C., discussed the insecticide situation for 1955 in which he stated that the supply of insecticides is ample provided the consumer makes his needs known in time.

Dr. A. W. Lindquist, Head, Insects Affecting Man and Animals Section of U.S.D.A., Washington, D. C., discussed the use of gamma radiation as a possible tool for the control or eradication of the screwworm. He cited the recent work of federal entomologists in eradicating screw-worms from an isolated island by dropping gamma-radiated screwworm pupae, which mated with native flies and caused them to lay sterile eggs.

Insecticide formulators were interested in data on a series of experiments relating to the control of flower thrips on blackberries, presented during the morning meeting by H. H. Tippins and Lacy L. Hyche, Alabama Polytechnic Institute. It was revealed that both parathion and malathion gave significant control of thrips and that one application is as effective as two. Both TEPP and nicotine sulfate however were found to be inadequate.

Meta-Systox, a systemic insecticide that has shown considerable promise for control of certain ecto-parasites of animals, was found to be highly toxic to rabbits in a review of recent experiments, presented by T. Farish and J. L. Dusi, Alabama Polytechnic Institute. J. C. Keller, H. G. Wilson, and J. H. Ringdahl, of the USDA, Tampa discussed granular baits for the control of house flies and concluded that bait containing two per cent of malathion, ten per cent of sugar and 88 per cent of cornmeal was more effective against house flies than a similar bait prepared with one per cent of diazinon, when tested on small garbage and trash heaps.

A report on "The Effect of High and Low Gamma Benzenehexachloride and Lindane Upon the Cotton Aphid," by Robert H. Mount and F. S. Arant, Alabama Polytechnic Institute, Auburn, included results of experiments conducted to determine the difference in the effectiveness of three per cent gamma dust formulated from 15 per cent gamma BHC, 41 per cent gamma BHC and

(*Continued on Page* 120)

Left, W. G. Eden, secretary - treasurer of the Cotton States Branch, and right, Dr. A. N. Tissot, Gainesville, Fla.

Photo, Tampa Morning Tribune

DREAM BEAN

Production of the soybean, once a poor relation in the bean family, has risen from three million bushels in 1920 to over 200-million bushels at the present time. Probably the most versatile plant known to science, it ends up in breakfast food, candy, margarine, mayonnaise, paints, varnishes, pharmaceuticals, cosmetics and insecticides—to name a few. With the use of modern commercial fertilizers, production of this dream bean is now reaching new highs.

Potash, an important component of these fertilizers, enriches the soil, improves crop quality, builds resistance to disease, and increases the crop yield. United States Potash Company high-grade muriate of potash has the highest K_2O content, and is free-flowing and non-caking—important advantages in the production of fertilizers that make today's soybean crops the finest ever grown.

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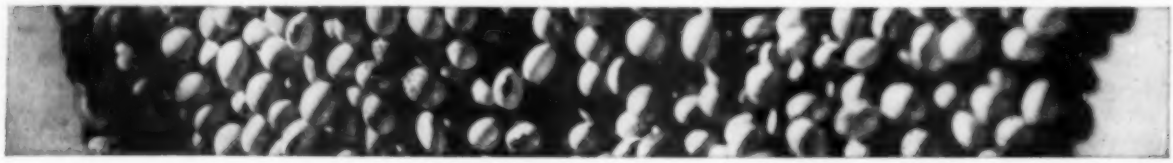


32 License TVA Process

TVA announced last month that, as of the close 1954, 52 companies had been licensed either to manufacture equipment developed at the TVA fertilizer plants or to use processes developed by TVA fertilizer technicians.

44 of the licenses were for the TVA-developed continuous mixer for the manufacture of superphosphate or for the continuous ammoniation process which permits addition of low cost nitrogen to superphosphate or fertilizer mixtures. The remaining eight covered miscellaneous patents.

In the same announcement TVA disclosed that 2,600 persons had visited its fertilizer plants at Muscle Shoals in 1954, including 651 representatives of private firms.

•

German Abstract Listing

Latest advances in product development and application refinements in the field of insecticides and fungicides are reported from Germany in a recent series of "Research Information Service, 53 Nassau, New York, listing translations in this field. Available free of charge, Bulletin No. 93 "Insecticides & Fungicides" offers abstracts of recent German patent applications and research reports.

•

Plan Chemurgy Conference

New crops research and agricultural research will be emphasized at the March 23-24 meeting of the National Farm Chemurgic Council, Inc. at the Dashler Hilton Hotel, Columbus, Ohio. Dr. Byron T. Shaw, administrator of agricultural research service of the USDA will deliver one of the principal addresses, "New Crops Research." "Economics of Agricultural Research" will be discussed by John H. Davis, director of the Moffeet program of agriculture and business at Harvard University.

•

Corn Borer Threat to Midwest

Corn Belt farmers in 1955 may be faced with a serious infestation of European corn borers if spring weather is favorable for this insect's development, say U. S. Department of Agriculture entomologists. This outlook is based on field surveys conducted last fall by 25 states infested by the corn borer, including those in the main Corn Belt. Information obtained from all these surveys was consolidated by USDA's Agricultural Research Service and released January 28 in the Cooperative Economic Insect Report.

•

Larvacide Prod. Names Porter

Larvacide Products, Inc., New York, manufacturers and distributors of fumigants and agricultural chemicals, announced recently the election of Richard P. Porter to the office of vice president. Mr. Porter was previously with Ethyl Corp., where he was in charge of the field development program for agricultural chemicals.

Prior to entering industry, Mr. Porter served the state of Virginia for several years as a research plant pathologist at the state agricultural experiment station. His home is in Chatham, N. J.

•

Aerosol Tomato Hormone

"Blossom-Set," a tomato hormone manufactured by Science Products Co., Inc., Chicago, for the garden supply trade announced recently the aerosol bomb packaging of the compound. The new container will be offered in a 12-ounce can.

•

Cost in Grasshopper Control

The January edition of SCAN (Shell Chemical Agricultural News) gives an insecticide cost comparison for control of grasshoppers and quotes a University of Nebraska entomologist as saying dieldrin is least expensive. Applied at the rate of one ounce per acre, it is reported to have a residual life of ten days and costs about 30 cents per acre. Other insecticides compared are aldrin applied at the rate of 4 ounces, having a residual life of 5 days and costs about 60 cents per acre; heptachlor applied at the rate of 4 ounces per acre has a residual life of 5 days and costs about 74 cents per acre; and chlordane applied at 1½ pounds has a residual life of 7 days and costs $1.20 per acre.

Aerial Spraying in England

Fisons Pest Control, Essex, England, is celebrating this year the tenth anniversary of the use of the helicopter as an agricultural implement. Fisons originated the technique in 1945. In 1948 it introduced the process of night spraying in an experiment in Africa, which also occasioned the initial appearance of the helicopter on that continent. During the past year Fisons has expanded its facilities with the erection at Harston of a new plant for the manufacture of hormone weedkillers. It now has subsidiaries operating throughout the British Commonwealth and in Ireland.

•

Bristol, Cyanamid Settle Suit

Representatives of American Cyanamid Co., New York, and Bristol Laboratories, Inc., New York, recently agreed on a settlement of the law suit brought by Cyanamid last September against Bristol claiming infringement of Cyanamid's U. S. Duggar Patent No. 2,482,055 by Bristol through the manufacture and sale of the antibiotic, tetracycline.

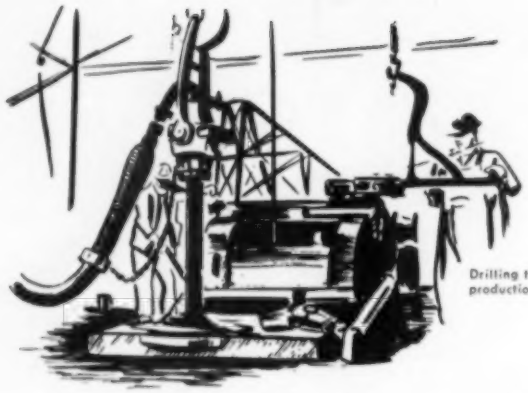
Under the settlement, Cyanamid will dismiss the suit, but Bristol will be obliged to taken an international nonexclusive license under the Duggar patent and other Cyanamid patents covering production of a tetra-cycline by direct fermentation. Bristol will pay royalties for past infringement and for future use of the processes and products covered by those patents.

•

Mathieson Names Hansen

H. Clay Hansen has been appointed agricultural specialist in the Arkansas Fertilizer District for Olin Mathieson Chemical Corp. His headquarters will be at the Olin Mathieson plant in North Little Rock.

Mr. Hansen was market analyst in the Western Fertilizer Division of the corporation at Little Rock for the past year and one-half. Earlier he was for 12 years active in farm credit work in Arkansas and for several years was a district supervisor for the Farmers Home Administration in Northwest Arkansas.



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McConnon Names Officers

At the annual board of directors meeting of McConnon & Co., Winona, Minn., J. R. McConnon was elected president, H. G. McConnon, vice president, and G. A. Ostrom, secretary-treasurer. J. R. M-Connon had been president and James McConnon, vice president before the change. W. T. Lemmon and R. W. Lundberg were also elected to the board of directors.

W. T. Lemmon is sales manager of The Mackwin Company Division of McConnon & Co. The Mackwin Division manufactures and sells agricultural chemicals including insecticides, fungicides and weed killers.

•

Korea to Have Fert. Plant

A contract for the construction of a 25 million dollar urea fertilizer plant in Korea was awarded last month to McGraw-Hydrocarbon, a joint venture of F. H. McGraw & Co., Hartford, Conn. and Hydrocarbon Research Inc., New York.

•

Pest Control Meet in Mass.

The 15th annual meeting of the eastern pest control operators' conference, sponsored by the National Pest Control Association and the University of Massachusetts was scheduled to be held at Amherst, Mass., February 3-5, J. Horsfall, consultant to Geigy Chemical Co. was to discuss "Diazinon and Related Insecticides", while T. O. Tufe, American Cyanamid Co., was to report on "Parathion, Malathion and Related Compounds."

•

Hold Raw Products Conf.

The annual Raw Products Conference on the production of vegetable crops for processing was held February 8-9th at Jordon Hall, New York State Agricultural Experiment Station, Geneva.

Featured events announced in the advance program were: "Research and Insect Control Economics on Processing Crops in 1955, Including Discussion of Residues," a panel led by Ray Kriner; and "Chemical Weed Control of Processing Crops," led by C. B. Sayre.

Manufacturers' Conference and Fertilizer Short Course Featured at Iowa State College, Ames, Ia., Jan. 17-18

MORE than 400 fertilizer manufacturers, dealers and people interested in fertilizers were attracted to the meeting sponsored by the Agronomy Department, Iowa State College at Ames, Ia., on Jan. 17-18. The 2-day session included a manufacturers' conference the first day and a fertilizer short course the following day.

The highlight of the Manufacturers' Conference was Marvin Anderson's discussion of the whole diffusion process of learning, and the identification of the specific classes of people responsible for the farmers' knowledge of fertilizers. The results discussed were obtained in a large survey of Iowa farmers conducted by the Iowa State Department of Statistics, and supported by a grant from the Tennessee Valley Authority.

Dr. W. V. Bartholomew reminded the group that nitrogen fertilizers should be sold more on merit in increasing crop yields for which there is plenty of field evidence, rather than on the basis of hastening residue decomposition, building up organic matter, and other effects for which there is little evidence and for which the laboratory and greenhouse evidence is often quite conflicting. Dr. John Pesek discussed recent research findings which showed that water solubility of phosphorus in fertilizers is important especially when phosphorus fertilizers are used in the hill for corn, or drilled for oats. The water solubility of the citrate soluble fraction, he pointed out, assumes less significance when the fertilizer is plowed under or is incorporated with the soil by disking. The afternoon session January 17th was climaxed by Dr. W. H. Pierre in a discussion of certain fertilizer problems solved in recent years, and problems which are facing the research people at present and to be solved in the future.

A feature of the Fertilizer Short Course was a showing of the films "The Big Test," and "Soil Test." The former film was loaned by the National Fertilizer Association, and the latter was produced by the Visual Aids Department, Iowa State College.

Dr. John Hanway discussed the fertility of Iowa Soils by soil areas, soil types, and profile distribution. The discussion was based on over 200,000 soil samples tested by the Soil Testing Laboratory. Dr. L. M. Thompson described the basic principles underlying fertility of soils, and emphasized how certain aspects of fertilization practices were governed by these principles in Iowa. A discussion of the function of mineral elements in plant nutrition by Dr. George Stanford completed this session. He pointed out that a dependence on deficiency symptoms is usually unwise in case of annual crops because corrective action is probably too late. He added that one exception was the spraying of ferrous sulfate to correct iron deficiency in soybeans.

The afternoon meeting was conducted by Mr. H. R. Meldrum and was designed to answer the practical problems met in actual practice. Dr. E. R. Duncan discussed the problems of when, where, why, and how much nitrogen to use in Iowa, while the same questions were answered for phosphorus and potassium by Messrs. Lloyd Dumeil and Joe Stritzel. As moderator of the evening panel discussion, Dr. Wayne Scholtes directed a lively discussion of current results with fertilizer trials by research agronomists Ray Nicholson, Lloyd Dumenil, H. R. Meldrum, and J. Pesek.

•

Pfizer Names Robinson

Chas. Pfizer & Co., New York, recently appointed Reginald Robinson to succeed Edward A. Poleselli as San Francisco representative of the company's Chemical Sales Division.

Mr. Poleselli has been transferred to Pfizer's New York headquarters.

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Aurora, Ill. - Wenatchee, Yakima, Wash.

Pennsalt Chemicals

Programs for Penn. Meeting

"One hundred years of service by Penn State to the State," will be the motto of the 1955 Short Course for Pest Control Operators of Pennsylvania, marking the centennial anniversary of Pennsylvania State University. The meeting will take place March 1-3 at the university campus, State College, Pa.

Agricultural chemists will be particularly interested in the lectures "Biological Control of Insects" by H. Frings, Penn. State Univ., and "Insect Resistance to Insecticides and What to Do about it," by A. N. Lindquist, Bureau of Entomology, USDA. Both lectures will be followed by general discussion.

Hubert Frings and Dr. D. E. F. Frear are in charge of arrangements.

•

Pulva President Dies

Pulva Corp., Perth Amboy, N. J. annouiced with regret the death of its president, F. Elmer Oswald on January 11th. Mr. Oswald was well known in the process equipment industries having been associated with the sale and manufacture of pulverizing machinery and allied equipment for approximately 28 years. He organized the Pulva Corporation in 1949.

•

Conn. Sta. Names Brigham

W. T. Brigham will be in charge of all plant pest regulatory and inspection work in the state of Connecticut, effective April 1, according to a recent announcement of the Connecticut Agricultural Experiment Station. Mr. Brigham will succeed Max P. Zappe, who will retire shortly. Mr. Zappe has been with the Connecticut station since April 1, 1914 .

•

Niagara Co. Moves West.

Niagara Brand Spray Co., Burlington, Ont., has acquired Chemical Products Ltd, Regina, as the first step in a projected expansion into western Canada. According to a company spokesman, increased demand for agricultural chemicals in the prairie provinces dictated the acquisition of further facilities by Niagara.

Established in 1909, Niagara is one of Canada's pioneers in the agricultural chemicals field. It manufactures and formulates fungicides, insecticides, and herbicides.

•

Sohio Names Tucker, Coleman

The petrochemical department of the Standard Oil Company of Ohio has named Henry J. Coleman sales manager and Hubert H. Tucker director of agricultural service, effective Jan. 1. Mr. Coleman has been associated with Standard since 1946, serving as staff assistant in marketing research, advertising manager, and chief of site development in the marketing department. Mr. Tucker was formerly president of the Coke Oven Ammonia Research Bureau at Columbus, Ohio.

The newly organized petrochemical department will have a plant in production in November 1955, according to Edward F. Morrill, general manager of the department. Products will include anhydrous ammonia, nitrate solutions and urea for agricultural use, and nitric acid for industrial use.

•

Public Health Chief to Switz.

Lawrence B. Hall, in charge of equipment development for the Savannah laboratories of the U. S. Public Health Service's communicable disease center, departed Jan. 19 for Geneva, Switzerland, to serve as a consultant to the expert committee on insecticides of the World Health Organization.

Before joining the U. S. Public Health Service, Mr. Hall served as regional engineer for the Georgia Dept. of Public Health at Brunswick, Swainsboro and Waycross.

CFA Soil Improvement Meeting

The Soil Improvement Committee of the California Fertilizer Assoc. will hold its third annual California Fertilizer Conference on the campus of the University of Caifornia, College of Agriculture, Davis, Calif., April 26, 1955. The advance program indicates that the meeting should be of interest to fertilizer industry management, salesmen, dealers, farmers and all others interested in soil fertility.

J. H. Nelson, conference chairman, reports that discussions will be organized around four major California crop classifications: pasture and forage, vegetables, deciduous and citrus fruits, and field crops. A panel will be held on each of the four topics during the afternoon session.

The annual joint meeting of the University of California Fertilizer Committee and the Soil Improvement Committee of the California Fertilizer Association will be held Wednesday morning, April 27, at the college campus dining hall.

•

IMCC Names Bell, Safford

Sanford R. Bell was named plant engineer at International Minerals & Chemical Corp.'s Bonnie chemical plant near Bartow, Fla. He succeeds Robert V. Safford, who was named assistant manager in charge of engineering at the Bonnie plant. The Bonnie chemical plant is located near Bartow, Florida.

•

Canners to Meet in Chicago

The 48th annual convention of the National Canners Association, to be held in Chicago, February 19-23 at the Conrad Hilton Hotel will bring together all segments of the canning industry to plan production and distribution of the 1955 packs of canned foods. Secretary of the Treasury George M. Humphrey will be the featured speaker at the N.C.A. sessions.

Raw products conferences scheduled for the 3-day meeting will deal with "Procurement of Raw Products," "Agricultural Management Problems," and "Pesticide Tolerances —Their Effects on Raw Product Procurement and Factory Operations."

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APPLES
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NFA Leaflet on Missouri

Most recent in its series of bulletins directed to specific states is the NFA leaflet on "How Fertilizer Can Make More Money for You . . . in Missouri." The four-page booklet lists figures on increased yields in corn, wheat, oats, cotton, pastures, weather effect, cost, etc.

•

Chem. Checks Pink Bollworm

A new organic phosphorus compound being tested at the Texas Agricultural Experiment Station, College Station, Texas, has been found to be effective against the pink bollworm, according to J. R. Brazzel and Dr. D. F. Martin, Texas A. & M. College.

Following are average tabulations of damaged cotton bolls and number of pink bollworms present after applications of DDT alone and in combination with the new phosphorus compound:

Check plots, no treatment, 31.1 damaged bolls, 50.9 worms; DDT treated plots, 1.5 pounds per acre, 20.5 damaged bolls, 31.7 worms; DDT plots, three pounds per acre, 23.8 bolls, 50.9 worms; DDT treated plots, 1.5 lbs. of new phosphorous compound, 5.16 damaged bolls, and 6.2 worms.

•

Tenn. Fert. Dealers to Meet

The Agricultural Extension Service and the Tennessee Department of Agriculture, in cooperation with fertilizer manufacturers and wholesale seed dealers, have arranged a series of meetings to be held Feb. 8-11 at Nashville, Jackson and Knoxville, Tenn., at which local dealers will be advised of latest developments in seed and fertilizer sales, crop fertilization, field crop varieties, university recommendations, and related topics. The schedule of meetings is: February 8, Andrew Jackson Hotel, Nashville; February 9, City Hall, Jackson; and February 11, U. T. Farm, Knoxville.

Among the participants in the program will be W. R. Allstetter, vice-pres., National Fertilizer Association; W. R. Little, manager, Tennessee Crop Improvement Association; and L. C. Jacobs, State Department of Agriculture. Mr. Jacobs will serve as chairman.

Webster Pendergrass, U-T Extension agronomist, is in charge of program arrangements.

•

Nopco Names R. W. Uster

A. V. Jay (left), eastern sales manager of the Agricultural Department of the Vitamin Division of the Nopco Chemicl Co., Harrison, N. J., announced recently the appointment of Ralph W. Uster (right) as district sales manager for the territory which includes South Dakota, Iowa, Nebraska, Kansas, and Missouri. Mr. Uster was formerly a feed nutritionist.

Names Distributors

O. W. Kromer Co., Minneapolis, makers of power sprayers and fertilizer applicators have appointed three new distributors of Kromer Equipment: Seitz Distributing Co., Billings, Montana; Smalley Manufacturing Co., Manitowoc, Wisc., Eastern Machinery Co., East Syracuse, N. Y.

•

Union Bag Mgr. Dies

William K. Jackson, Jr., manager of the packaging services division of Union Bag & Paper Corp., New York, died suddenly at his home in Freeport, N. Y., Jan. 25, at the age of 44. He had been with Union Bag since 1935. Surviving are his wife, a daughter and four sons.

•

Green Pastures Group Meets

Fertilizer men, seedsmen, and college representatives attended the annual Green Pastures "Kick-off" meeting at Louisville, Ky., Jan. 4. Reports were presented on the 1955 program and on work accomplished by the group during the past five years.

Hercules Profit Up, Sales Off

Hercules Powder Co., Wilmington, Del., announced in its 1954 report to stockholders, released last month, that net income during 1954 had risen 21%, in spite of a 1½% decline in sales and an all time high in plant expenditures. The elimination of the excess profits tax was regarded as a primary factor in the profit increase.

One of Hercules big investments in 1954 was the purchase of the Missouri Ordnance Works, adding 40,000 tons per year to its anhydrous ammonia production capacity.

•

Thomas Ala. Operations

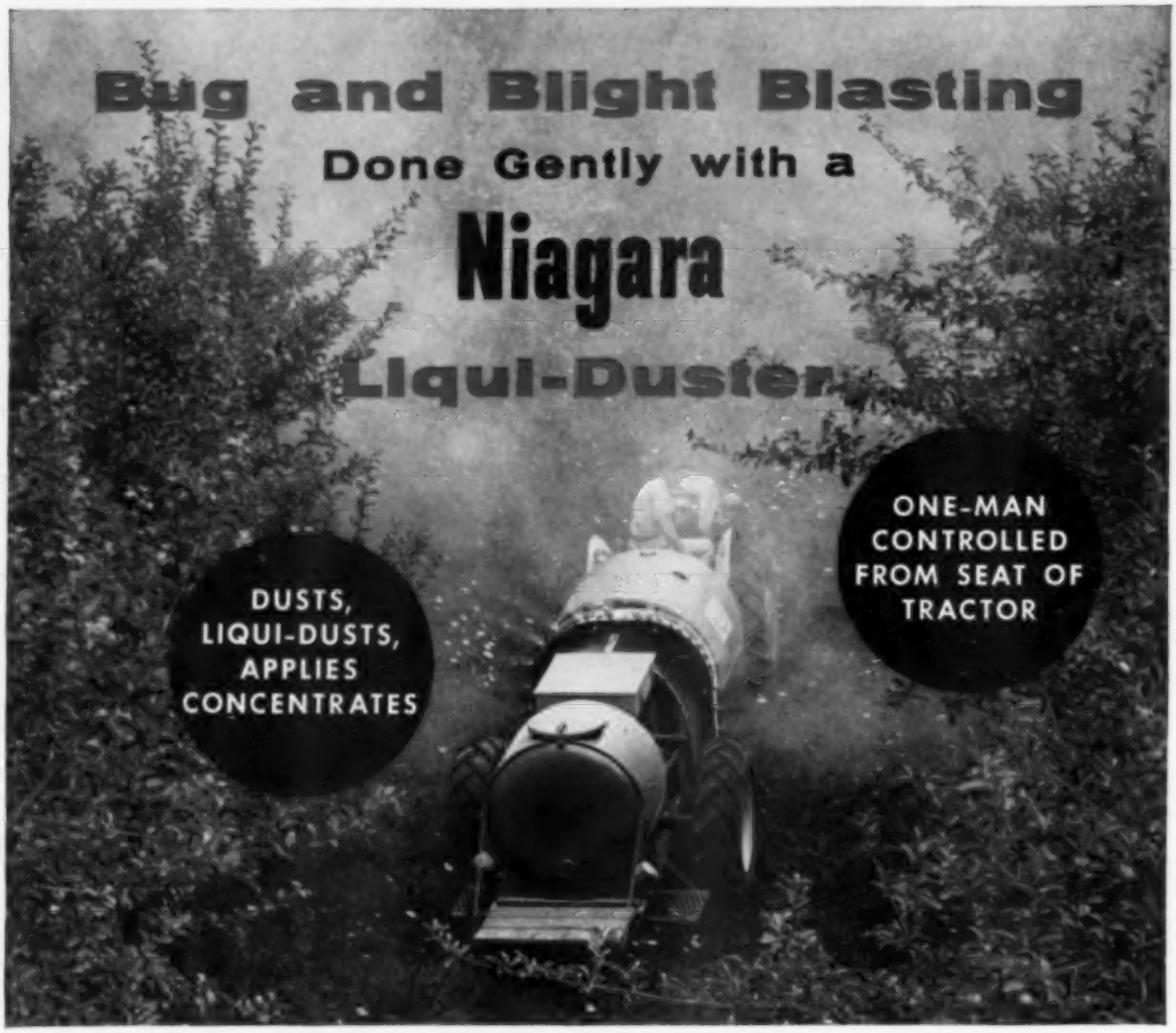
The Thomas Alabama Kaolin Co., producers of "TAKO" an airfloated colloidal kaolintic kaolin clay, have begun further stripping operations at their Chalk Bluff, Alabama, mines that will be a continuation of their current operation in this area. "Output of the expansion will add to tonnage of kaolinitic kaolin clay for processing at the Thomas plant at Hackleburg, Alabama.

Their newest plant is equipped with modern dry grinding and handling equipment. The finished processed product, "TAKO" high grade pure colloidal kaolinitic kaolin, is used by various industries, especially the fertilizer, insecticide and pesticides industries. The manufacturer reports that "TAKO" airfloated colloidal kaolinitic kaolin meets the requirements for use in fertilizers, insecticides and pesticides formulations. "TAKO" is available in 50 and 80 pound valve Kraft paper bags.

•

Publish NSC Minutes

The minutes of the December meeting of the executive committee of the National Safety Council Fertilizer Section, held in Memphis, Tenn., were recently mimeographed and distributed to members. Included in the report are the following committee assignments: Bogie Diserens, chairman, research committee; Vernon Gornto, chairman, membership committee; A. B. Pettit and John Smith, membership committee. Tom Clarke, 1955 chairman, presided.



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Armour Advances Miller

L. M. Miller was recently appointed eastern regional sales manager of the chemical division of Armour and Co., with headquarters at North Bergen, N. J. Mr. Miller, formerly manager of the division's market development department in Chicago. succeeds the late Kenneth E. Johnson.

As technical salesman and manager in the market development department, Mr. Miller worked on development of tertiary amines and fatty acids and projects relating to the textile and paper industries. E. L. Rhoads, asst. mgr. of the derivatives department, has succeeded Mr. Miller as manager of market development.

•

Niagara Appointments

Niagara Chemical Div. of Food Machinery and Chemical Corp., Middleport, N Y., recently announced the appointments of J J. Lynch as director of traffic and G. W. Bennett as traffic manager. Mr. Lynch has been chairman of the Traffic Committee of the National Agricultural Chemicals Assoc. for the past two years.

•

Shade Tree Conf. Feb. 23

Two papers of interest in the agricultural chemical field are on the program for the tenth annual meeting of the Midwest Shade Tree Conference at the Chase Hotel, St. Louis, Mo., Feb. 23-25.

"Trace Elements and Their Effect on Plant Life" is to be discussed by Dr. E. R. Spencer, consulting botanist and plant pathologist, Lebanon, Ill., while Dr. Robert N. Goodman, Univ. of Missouri, Columbia, Mo., will report on "Concentration and Timing of Antibiotic Sprays For Control of Fire Blight." Dr. T. W. Butz of the Univ. of Missouri will also present a survey of "Tree Diseases in the Midwest." Standard Oil Co. is also showing its motion picture on "Dutch Elm Disease and Elm Phloem Necrosis," with Ernie Herrbach, company entomologist, in charge of the presentation. Other features of the three-day program deal with operational procedures and business problems of the professional arborist.

•

New Carbide Insecticide

A new insecticide for controlling house flies and other insects has been announced by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. It has been given the name "cyclethrin" and is chemically related to allethrin. The complex cyclethrin molecule was first synthesized in Carbide's research and development laboratories at South Charleston, W. Va., and was evaluated against insect pests by the Biological Research Fellowship at Boyce Thompson Institute for Plant Research, Incorporated, Yonkers, N. Y.

Cyclethrin is synergized by readily available synergists to a far greater extent than is allethrin. Therefore, it can be used to advantage in oil space prays and in low-pressure aerosols for use against house flies, gnats, and mosquitoes. Cyclethrin is more effective when used in dairy and livestock sprays. Field tests have shown that treadle spray concentrates containing cyclethrin afford dairy and beef animals excellent protection from house flies. In addition, sulfoxide and piperonyl butoxide synergize cyclethrin better than allethrin for knockdown of German roaches. Cyclethrin has the same low order of toxicity to warm-blooded animals as allethrin or pyrethrins.

Cyclethrin is available at the present in limited quantities for test purposes.

•

Diamond Research Center

Diamond Alkali Co. is now modernizing and enlarging certain key facilities of its Research Center in Painesville, Ohio, at a cost of approximately $200,000 to meet the expanding needs of the firm's fundamental and applied research programs. Contract for the project has been awarded to the Hubert Rust Construction Co., Painesville, which already has started to work on the job.

IMCC Names Wilkerson

The newly established position of advertising and sales promotion manager at Minerals & Chemicals Corp., of America, Philadelphia, will be filled by Robert W. Wilkerson. A. G. Blake, executive vice president of Minerals & Chemicals Corp., reported that the new post was created to coordinate increased sales promotion and advertising activities due to the recent merger of Edgar Brothers Co. and Attapulgus Minerals into the present corporation.

•

Appointments at Bemis

Bemis Bros. Bag Co., St. Louis, announced four appointments early this month. C. C. Cobb, formerly sales manager of the 3-plant paper specialty organization, was named resident manager of the St. Louis paper specialty plant. J. T. Trotter replaced R. B. LeRoy as sales manager of the multiwall paper bag plant at East Pepperell, Mass. In the Buffalo division, C. C. Smith was appointed plant merchandiser and D. G. Chase sales manager.

•

Spain Cleared in Dumping Case

Muriate of potash imported from Spain is being sold at fair value in the United States according to a recent Treasury Department decision. Accordingly, the department is closing its dumping study involving Spanish potash. Meanwhile the tariff commission is still investigating cases involving East Germany and several West European countries.

•

Benson at NCC Conference

Secreary of agriculture Ezra Taft Benson was the principal speaker at the 17th annual meeting of the National Cotton Council at the Shamrock Hotel, Houston, Texas, Jan. 31-Feb. 1. The second day of the conference featured an address, "Farmers Look to the Future," by Charles B. Shuman, pres., American Farm Bureau Federation.

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V. McCarthy on Round the World Tour

Currently on a three - month round - the - world cruise on the Cunard cruise ship, S. S. Caronia, accompanied by his wife, is Vern I. McCarthy, president of Vulcan Stamping & Mfg. Co., Bellwood, Ill. Sailing from New York January 21st, the ship will put in at ports in the Caribbean, South America, Africa, India, Indonesia, Hong Kong, Japan, and return to New York via San Francisco, Acapulco, Mexico, and the Panama Canal. Shown on the after deck just before sailing time from left to right are: Mrs. Vern McCarthy; Bud McCarthy; Herb Scharbach, Gordon D. Zuck, president Vulcan Steel Container Co., and Vern J. McCarthy.

S. C. Fertilizer Review

Clemson Agricultural College, Clemson, S.C., recently issued a 3-page summary showing the distribution of fertilizer in South Carolina counties by grades and materials for the second half of 1954.

•

Cotton Defoliation Meeting

Claude L. Welch, National Cotton Council, Memphis, welcomed delegates to the ninth annual Beltwide Cotton Defoliation Conference, sponsored by the National Cotton Council, Jan. 13-14, at the Hotel Peabody, Memphis. Dr. W. H. Tharp, USDA, was conference chairman.

A round table discussion of "Field Studies with Defoliants and Desiccants," followed Dr. Tharp's address. Participants were moderator T. E. Corley, Alabama Ag. Exp. Station, Auburn, and field research specialists from cotton belt experimental stations. During the same session, a panel presided over by S. P. Johnson, Texas Ag. Exp. Station, College Station, reviewed "Studies on Special Phases of Cotton Defoliation."

Chemical company representatives attending the conference found the afternoon panels on "Factors Influencing Boll Rot" and "Basic and Applied Studies with Amino Triazole and Other Growth Inhibitors" especially interesting. The first discussion was headed by J. T. Presley, USDA, Beltsville, Md., while W. A. Balk, Edisto Exp. Station, Blackville, S. C. presided over the second.

The meeting on January 14th was devoted to a technical discussion of abscission in cotton physiology, followed in the afternoon by papers of more general interest including: "Evaluation of Cotton Defoliation as an Aid to Mechanical Harvesting," by G. V. Crowe, agricultural economist, and H. R. Carns, Delta Branch Exp. Station, Shafter, Calif.

Chairman of the final session was E. E. Berkeley, ACCO Fiber and Spinning laboratory.

•

Residue Tolerance Discussed

A PANEL discussion on "Residue Tolerances — The Fruit and Vegetable Growers' Responsibility" highlighted the January 28 meeting of the New Jersey State Horticultural Society at the War Memorial Bldg, Trenton, N. J. Participating were Robert C. Stanfill, FDA, Philadelphia; Lea Hitchner, NACA, Washington, D. C.; Dr. Charles H. Mahoney, National Canners' Association; and Harry Smith, New Jersey grower, with Ordway Starnes, New Jersey Agricultural Experiment Station, New Brunswick, N. J., as moderator. Earlier in the day, the fruit growers and vegetable growers held separate meetings, with the former emphasizing farm management and the latter stressing soil care.

Dr. Starnes led off the round table on residue tolerances by pointing out that the main purpose of the panel would be to review the grower's responsibilities under the Miller amendment and existing inter-state commerce legislation. R. C. Stanfill and Lea Hitchner summarized the history of the amendment and pointed out that the growers' sole obligation would be to follow precisely the directions printed on the labels of the pesticide products, since the conformity of these directions with the Miller amendment would be the responsibility of the manufacturers. Mr. Stanfill said that in the event that a grower disregarded these recommendations, intentionally or inadvertently, and his crop showed a higher residue than is permitted under the Miller Act, the crops would be confiscated and the grower would be liable to a one year prison sentence.

Mr. Mahoney, representing the processing industry, mentioned that, as a result of several cases of excessive residues, the NCA would send more representatives to farms to see that pesticide directions were being correctly carried out.

Mr. Mahoney then reminded growers that pesticides must be used only for products designated on the label. Most of the cases of contamination that had come to his attention were results of the use of a pesticide on the wrong crop; where farmers had assumed that what was safe on one crop would be equally safe on another.

1955 spraying recommendations for apples and peaches were distributed at the meeting of the fruit growers, where Leland G. Merrill, Jr., New Jersey Agricultural Extension Service, New Brunswick, N. J., reviewed some of these recommendations in a talk on "Orchard Insect and Disease Control." Dr. Russell B. Alderfer, Rutgers, N. J., spoke on the care of orchard soils, paying particular attention to the problem of maintaining a high level of nitrogen. He compared the efficacy of various cover crops and described methods of applying fertilizer to trees without loss of nitrogen content to clover or blue grass cover crops.

The afternoon panel on residue tolerances was preceded by "The Experiment Station and Horticulture," Dr. William H. Martin, New Jersey Ag. Exp. Station; and "New Developments in Marketing," Joseph F. Hauck, New Jersey Ag. Extension Service.

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Midwest Agronomists to Meet

Round table discussion of more efficient, economical methods of producing corn, small grains and legume grass crops and reports on the latest results of fertilizer research will highlight the annual joint meeting of Midwestern agronomists and fertilizer industry representatives, sponsored by the Middle West Soil Improvement Committee, at Palmer House, Chicago, Feb. 17-18.

Dr. F. W. Smith, Kansas State College, will be chairman. The conference will open with an address by H. S. Vorhes, president of the Middle West Soil Improvement Committee, after which the folowing papers will be presented: "Sure Fire Alfalfa Production," O. J. Attoe, University of Wisconsin; "Fall vs. Spring Application of Nitrogen Fertilizer," John MacGregor, University of Minnesota; "The Significance of Water Solubility in Phosphatic Fertilizers," John R. Webb, Iowa State College; "The Effect of Fertilizers on the Establishment and Maintenance of Legume-Grass Mixtures," Richard Swenson, Michigan State College; "MWSIC Sponsored Research in Missouri," John Falloon, University of Missouri; "Yield Potentials of Corn Belt Crops," M. B. Russell, University of Illinois; "Fertilizer Economics in a Period of Surpluses," Russell Coleman, president NFA.

The theme of the Feb. 18 program will be "Efficiency in Crop Production." The session will begin with an analysis of efficient tillage practices by R. L. Cook. A symposium on "Efficient Corn Production" will follow; H. J. Mederski, Ohio State University will report on the Eastern corn belt, and E. R. Duncan, Iowa State College, on the western corn belt. "Efficient Wheat Production" will be reviewed by soil specialists from three wheat producing areas: S. A. Barber, Purdue University, "Soft Winter Wheat;" Robert A. Olson, University of Nebraska, "Hard Winter Wheat;" and E. B. Norum, University of North Dakota, "Spring Wheat."

Paul M. Burson, University of Minnesota, will close the conference by presenting the agonomists' suggestions to industry. Z. H. Beers, executive secretary estimates that some 500 representatives of industry and research will attend.

•

Southern Safety Group to Meet

The fertilizer section of the Southern Safety Conference will hold a meeting at the Jung Hotel, New Orleans, Feb. 2-March 1, according to an announcement by Curtis A. Cox, chairman.

The following reports are included in the 3-day program:

"Safety—A Sound Investment," A. B. Pettit, Davison Chemical Co., Baltimore; "Report on Activities of Safety Organizations in the Fertilizer Industry—National, Regional and State," Vernon S. Gornto, Smith-Douglass Co., Inc., Norfolk, Va.; "Handling Ammonia Solutions Safely," Charles L. McDaniel, Lion Oil Co., El Dorado, Ark.; and "Safe Blasting Practices," A. L. Foster, International Minerals and Chemical Corp., Spartanburg, S. C.

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Beech-Nut Names Kubovciak

The Beech-Nut Packing Co. announced last month, two appointments in the food laboratory of its main plant in Canajoharie, N. Y. Michael Kubovciak was named head of the bacteriology laboratory and Wendell F. Phillips was named head of the food chemistry laboratory.

•

Coale Announces Retirement

James S. Coale announced his retirement as board chairman of the I. P. Thomas & Son Co., Paulsboro, N. J., at a recent dinner honoring him on the completion of a 56-year association with the company. Mr. Coale had served for a number of years on the board of the National Fertilizer Assoc. and is a member of the Riverton Shade Tree Commission.

Prior to his retirement, Mr. Coale had been negotiating with the Pennsylvania Salt Manufacturing Co. for integration of the I. P. Thomas & Son Co. as an operating division of Pennsalt. The merger is expected to be completed shortly.

Food Mach. Appoints Pond

S. A. Pond, who has been acting as industrial relations manager for the Chemical Divisions, Food Machinery and Chemical Corporation, New York, during the past year, was appointed to fill that position permanently in an announcement early last month. Prior to joining FMC in 1951, Mr. Pond was associated with Pan American World Airways, Inc., and the Marine Magnesium Products Corp., division of Merck & Co., Rahway, N. J.

•

S. C. Observes Centennial

South Carolina entomologists representing all branches of the profession met at the Jefferson Hotel, Columbia, S. C., in December, 1954. The meeting included a program centered around the Centennial of Professional Entomology theme. Dr. M. D. Farrar, Dean of Agriculture of Clemson Agricultural College, keynoted the meeting with an address entitled, "Professional Entomology, Past, Present and Future."

Representatives of the South Carolina Extension Service and the State Crop Pest Commission outlined early entomological work, especially that concerned with the invasion of the state by such pests as the boll weevil, Mexican bean beetle and other pests. The U. S. and Public Health agencies likewise presented historical summaries of early work with insects affecting human welfare. Attention during the program was also given to reports on some of the more recent developments in entomological work such as aerial dusting and industrial entomology.

•

New England NH_3 Plant

The anhydrous ammonia business will have its New England outpost when Northern Chemicals Industries, Inc., Baltimore, completes a projected $9,000,000 plant at Searsport, Maine. Northern Chemicals intends to start construction this spring and finish sometime during the first half of 1956. The plant will be one of the first in the nation to use residual oil as the exclusive source of hydrogen.

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Southern Weed Conference Elects Klingman

THE fundamental need for better weed control in cotton is simply to provide more factual information on chemical use to the farmer," Dr. E. D. Witman, manager of agricultural development for the Columbia-Southern Chemical Corp., told the Southern Weed Conference at its eighth annual meeting at the Hotel Soreno, St. Petersburg, Fla., January 18th.

"To date," Dr. Witman reported, "only a trickle of factual information on chemical weed control has reached the farmer from state and federal authorities. Farmers are afraid to use chemical controls because of reports of injury, expensive specialized equipment needed, element of chance on retreatments of soil and cost factors which are based on rumors and hearsay.

Quite often farmers and bankers are loathe to investigate chemical weed control and dismiss great savings merely because such 'new fangled' ideas have not been interpreted to them in a simple, factual way," he said.

More than 300 agriculturalists, manufacturers, researchers and representatives of government from 13 states were attracted to the 3-day conference, to hear reports and discussions on new compounds, new uses of old products, control measures etc.

New officers for the coming year were elected, with G. C. Klingman, North Carolina State College, Raleigh, N. C. being named president. Other officers are: W. B. Albert, Clemson College, Clemson, S. C., vice president; and E. G. Rodgers, University of Florida, Gainesville, secretary-treasurer. Named to the executive board were W. K. Porter, Louisiana Agricultural Experiment Station, Baton Rouge, La.; H. E. Rea, Texas A &M., College Station, Texas, and J. R. Wheatley, Carbide & Carbon Chemicals Co., New York.

A new pre-emergence herbicide which field studies indicate will eliminate weedy grasses from certain grass as well as broadleaf crops without injury to the crop was described by Dr. L. H. Hannah, Monsanto Chemical Co. Mr. Hannah said that the new weed killer, 2-chloroallyl diethyldithiocarbamate (CDEC), has given excellent control of grasses at rates ranging from three to six pounds per acre. "Effective control of annual weedy grasses in corn and soybean rows was obtained by 13-inch band treatments using less than two pounds per acre," he said.

The new material is similar in performance to alphachloro - N,N-diallylacetamide (CDAA) and alpha-chloro-N, N-diethylacetamide (CDEA) which the company announced in December, 1954, and was field tested at the same time. Legal requirements prevented its announcement earlier.

CDEC appeared to give slightly better grass control than CDAA and CDEA at all locations of a cooperative field program to determine if the new herbicide could selectively control annual grasses in corn, Hannah reported.

He said that both classes of materials are still in an experimental stage and estimated that at least another year of field trials in cooperation with growers and experiment stations would be needed before they could be made available commercially.

The results of tests in 2700 widely-scattered plots indicate that under most conditions the new products are superior grass-specific pre-emergence herbicides for such crops as sweet corn, onions, carrots, broccoli, spinach, snapbeans, lima beans, turnips, radishes and table beets.

Satisfactory control was obtained of pigweed, purslane and other broadleaf weeds in addition to annual grass pests such as giant foxtail, wild oats, cheat grass and crabgrass, according to data presented by Hannah.

None of the materials caused visible crop injury or reduction in yield, with the exception of cucurbits, even when used at a 12-pound-per-acre rate, twice the rate necessary for adequate weed control, Hannah said. Slight injury was noted in alfalfa, ladino clover, red clover and birdsfoot trefoil when both pre-emergence and post-emergence applications were made with CDAA and CDEA. In the same experiments, CDEA did not injure the legumes.

Hannah pointed out that the materials are highly water soluble, which may account for their effectiveness even on soils low in moisture. However, neither weed control nor vigor of the crop has been adversely affected by heavy rainfall immediately after their application.

In his address to members, president W. C. Shaw, USDA, Beltsville, Md., advised that more public support of research on weed control is necessary to curtail the tremendous annual damage due to weed and insect losses. A survey of losses in agriculture conducted by the USDA, reported to Dr. Shaw, shows that the annual loss due to insects is in the neighborhood of four billion dollars. The losses caused by weeds and the cost of control are estimated at about five billion dollars annually, he said.

Dr. D. W. Colvard, North Carolina State College, Raleigh, N. C., discussed the role of state experiment stations and extension services in developing a weed control program, emphasizing the need for cooperation in the schools of agriculture, the USDA and industry.

Featured also at the Conference was a discussion on the effects of legislation and regulation on herbicide research and use by Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Association. Mr. Hitchner pointed out that the field of herbicides for control of weeds is expanding rapidly and proposals for control by legislation and regulation must eventually be anticipated. The type regulation that develops, he said, will decide the rate of progress in research and the production and use of these materials. Legislation, he continued, has an impact where herbicides are used on food crops, in herbicidal research, etc.★★

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Crockett Joins Hollingshurst

E. Gordon Crockett, formerly vice-pres. of Chas. Page & Co., Inc., New York, was appointed president of Hollinghurst & Co., New York, last month, to succeed Arthur Berger. Mr. Berger had been president since the death of Bernard O. Graves in 1943, and will continue as chairman of the board.

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CFA Issues Warning

The California Fertilizer Association reminded farmers in a recent announcement that even though fertilizer use is at a record high, soil depletion or a repetition of the 1930 dust storms may occur unless the land is protected by employment of approved soil conservation methods and correct cultural practices.

•

Wilbur-Ellis To Build at Seattle

Wilbur-Ellis Co., Seattle, Wash., expect to complete a modern insecticide plant at Seattle early this season. It will be Wilbur-Ellis's second agricultural chemicals installation at Seattle where the company already has a fertilizer plant.

•

Holmes Joins Master Tank

Will K. Holmes recently joined the sales staff of Master Tank & Welding, Dallas, Texas. Mr. Holmes will specialize in the sale of applicators, tank transports, storage tanks, and other ammonia equipment.

•

Build NH_3 Storage System

A 12,000 ton anhydrous ammonia storage system will be operated at President's Island near Memphis, by Mid-South Chemical Corp. about March 1.

Company officials point out the plant will have at its disposal the nation's first river-rail-highway distribution facilities. At the center of the installation will be an eight acre distribution center.

The company will have fifteen 30,000 gallon ammonia tanks for storage, in addition to an 800 acre ton capacity barge and 100 railroad tank cars with 25 ton capacity, each. In addition to ammonia Mid-South will also handle potash, phosphate and other mixed fertilizers.

North Central ESA Meeting March 24-25

ENTOMOLOGISTS from more than a dozen states will convene at the annual meeting of the North Central Branch of the Entomological Society of America to be held at East Lansing, Mich., March 24 and 25. The theme of the meetings, which will be held in the Kellogg Center for Continuing Education on the Michigan State Campus, will be "Today and the Next Ten Years." Specialists in all phases of entomology will review the present status of their fields and will look ahead to predict the trends of the future.

Among the speakers scheduled for the two-day session are: Dr. Harold Gunderson of Iowa State College who will speak on future developments in field control of insect pests which annually damage millions of dollars of farm crops. Dr. C. C. Alexander of Geigy Agricultural Chemicals, New York, will review the trends in the chemical development field.

Chemicals and chemical control will not be the only subject of the meeting. Biology, insects' relation to their environment, classification and development of new taxonomic groups will all be given attention. Dr. H. H. Ross, University of Illinois and Dr. A. C. Hodson, University of Minnesota will discuss the new developments in studies in these fields. Dr. Roger C. Smith of Kansas State College will show the entomologists where they are going in the teaching profession. Dr. Floyd Andre, director of the Iowa Agricultural Experiment Station will discuss anticipated developments in regional research while the outlook for future legislation will be presented by Dr. W. W. Sunderland of the Dow Chemical Co.

Members and guests attending will also hear a discussion of the possible future activities of the North Central Branch which will be presented by Dr. T. C. Allen of the University of Wisconsin, who is chairman of the North Central Branch and will preside at the opening general session. Dr. C. R. Weaver is program chairman.

•

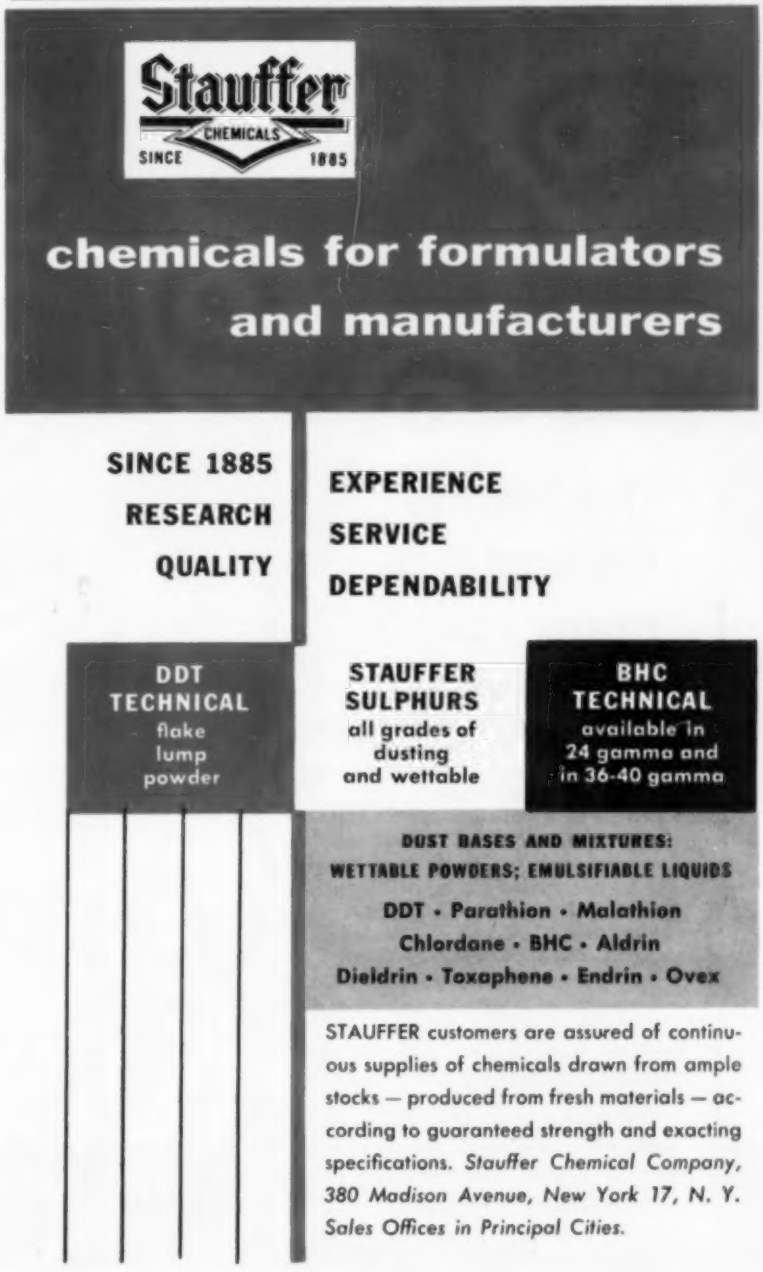
Metasap Chem. Has New Lab.

A new laboratory was recently opened by the Metasap Chemical Co. at its Harrison, N. J. plant to function as a sales service and research center. Metasap is a subsidiary of the Nopco Chemical Co., Harrison, N. J.

Arwell Announces Seminar

Arwell, Inc., sanitation and general pest control consultants, Waukegan, Ill., have announced plans for their annual sanitation seminar to be held in Chicago sometime during the middle of April. The exact dates of the meeting will be announced later.

One of the purposes of the seminar is to foster greater co-operation between manufacturers, public health authorities and the pest control industry.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CHEMICALS
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DUST BASES AND MIXTURES:
WETTABLE POWDERS; EMULSIFIABLE LIQUIDS
DDT • Parathion • Malathion
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Dieldrin • Toxaphene • Endrin • Ovex
STAUFFER customers are assured of continuous supplies of chemicals drawn from ample stocks — produced from fresh materials — according to guaranteed strength and exacting specifications. Stauffer Chemical Company, 380 Madison Avenue, New York 17, N. Y. Sales Offices in Principal Cities.

"The hands unload them rough"

—says Fred Schroer, Jr. of Valdosta, Ga.

"I've never seen a thread give under this pounding and believe me, if they weren't tough burlap bags, we'd have a heavy loss over the years from waste."

Fred should know. He and his brother, Herbert, now run the 1200-acre farm of their father, Fred W. Schroer, retired Master Farmer and pioneer in the modern agricultural age of South Georgia. Mr. Schroer says he's been using burlap bags since 1912 and, "During the years, I've had less trouble with burlap bags than any one thing I use. First thing I did this year was put in our fertilizer order—in burlap bags, of course. You can't beat them—no matter how you try or what you use."

That's a strong statement from such an outstanding farmer, but typical of what farmers all over the country tell us. Burlap bags are *preferred* by farmers.

Just ask your own customers—

they'll tell you that burlap

Is strong — takes dragging, dropping, *man-handling* — any tough job on the farm.

Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

THE BURLAP COUNCIL
of the Indian Jute Mills Association
155 East 44th Street, New York 17, N. Y.

Suppliers' BULLETINS

Paint Reduces Hopper Corrosion

Chemists have developed a line of new paints that effectively delay corrosion of metal by plant food chemicals. Two years ago, at the request of the Farm Equipment Institute, testing of other metals, plastics, rubber coatings and paints got under way. A hopper coated with the special paint is reported to withstand the heavy use for extended periods.

•

New Bemis Packing Valve

A new inner sleeve valve for multiwall paper fertilizer bags was recently introduced by Bemis Bros. Bag Co., St. Louis. Bemis claims that firmer closures and quicker packing are permitted by patterned creases in the valve sleeve and a new design of the sleeve.

•

Self-Unloading Transp. Unit

Baughman Mfg. Co., Jerseyville, Ill., recently announced production of the "Bulkmobile," an automatic, self-unloading transportation unit. Baughman reports that the unit will discharge from ½ to 2 tons per minute, depending on weight and method of discharge. Body conveyor and discharge accessories are hydraulic.

•

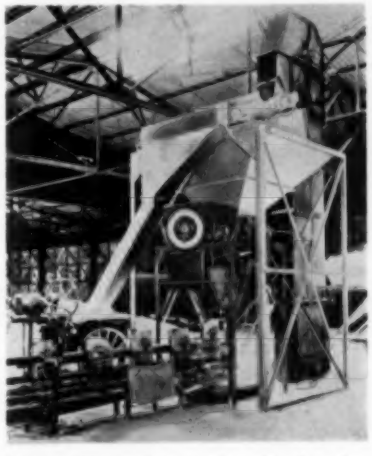
New Chipman Herbicide

"Chlorea" a non-selective weed and grass killer for industrial, agricultural and railroad use was announced recently by Chipman Chemical Co., Inc., Bound Brook, N. J. Chlorea is a uniform, non-separating combination of sodium chlorate, borate and CMU . . . combining the proved effectiveness of chlorate on deep-rooted weeds with the prolonged soil-surface action of CMU on shallow-rooted grasses and annual seedling growth. It is reported also to have a lasting residual effect to inhibit regrowth. Chlorea is non-poisonous and, because of its borate content, does not create a fire hazard when used as directed. It can be applied dry or used as a water-mixed spray.

•

New I & C Bagger

A new I & C Bagger (Model UB-101) is being put on the market according to a recent report by Union



Bag & Paper Corp., New York, sales agents for this automatic weighing and filling machine and other Inglett & Corley equipment.

The new machine works in conjunction with a moving conveyor and sewing head. The weighing and filling cycle is completely automatic. Pre-weighed materials are delivered through the machine's bag chute, and the filled weight drops each of the open mouth multiwall bags on to a moving conveyor belt which leads them through the sewing head.

In addition to incorporating the basic principles of the original machine (Model UB-100) the new machine offers these added advantages: dial type scale, and a new switch system, which weighs units from 25 to 200 lbs. and allows a rapid change of weight units.

•

Diamond Issues Brochure

Diamond Alkali Co., Cleveland, recently issued a brochure depicting the contributions of chemicals to the American standard of living. Entitled "15 Portraits in Print of Diamond Chemicals and Their Contributions to Everyone's Progress," the booklet is a collection of 15 selected full-page, four-color advertisements published by the company in the past few years.

•

New Blending System

Naugatuck Chemical Div. of United States Rubber Co., Naugatuck, Conn., recently initiated a new latex blending operation at its Kralastic manufacturing plant. A novel feature of the operation is the use of load cells to perform the weighing and proportioning of the individual liquid products. By the new method as many as six liquid products are blended automatically.

•

Carbide Issues Booklet

"Cellosolve and Carbitol Solvents," was issued last month by Carbide and Carbon Chemicals Co., a division of Union Carbide and Carbon Corp., New York. The booklet describes in detail the nine commercial glycol-ethers sold by Carbide and has a special section devoted to the specifications of the glycol-ethers and the test methods used to check them.

•

Catalog of Processing Equip.

Catalog reviews entire line of chemical processing, food processing, fertilizer and fish reduction equipment. Booklet introduces and features Dehydro-Mat. Bulletin 854 is issued by Edw. Renneburg & Sons Co., Baltimore.

•

New Swift Plant Food

Swift & Co., Chicago, announced recently a new product of its Plant Food Division. "Golden Vigoro Complete Lawn Food," does not burn growing grass when applied at recommended rates, according to the manufacturer.

NOW, DIRECT FROM US, PESTMASTER*DDT Technical for your dusts, wettable powders, solutions, and emulsions. This leading brand of 100% DDT is hard, clean, stable. Its use will add kill, stability and uniformity to your formulations. Phone, write or fill in the coupon below for prices, conditions and samples.

Users or exporters of 75% DDT Wettable powder should investigate our PESTMASTER* Brand. Review its resistance to tropical conditions, its uniform wettable and suspension properties, its carefully controlled packaging which preserves its qualities. Remember, PESTMASTER* 75% DDT Wettable does the job when it gets on the job — Asia, Africa, South America, Europe, here at home—wherever you want it. Write for prices, conditions, samples. Use the coupon.

Send a sample of PESTMASTER* DDT Technical Grade (100%) ☐ Prices ☐
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D-55-1

QUALITY PRODUCER OF PESTMASTER* DDT & METHYL BROMIDE AND OTHER AGRICULTURAL CHEMICALS

New Stauffer Pesticide

"Vapam," a new agricultural pesticide, has just been announced by Stauffer Chemical Co. Consisting of sodium N-methyl dithiocarbamate, this product has been field tested during the past two years as Compound N-869.

A general purpose soil fumigant, "Vapam" is reported to control practically all types of soil-borne diseases, nematodes, growing weeds and weed seeds, as well as certain species of soil infesting insects and related pests. The manufacturer advises it is especially suitable for seed bed treatment, and also shows promise for a wide range of soil problems confronting farmers, nurserymen, and home gardeners.

The compound is readily soluble in water and can be introduced into the soil through irrigation equipment, to the plow sole, or to the ground surface in connection with the use of a rototiller. It is reported that with suggested methods of application no ground coverings are required.

Vapam is stable in the commercial concentrated solution, but decomposes in damp soil into a gas which dissipates within a few days. Under most conditions, crops may be planted within seven days after soil treatment.

•

Arkell and Smith Bulletin

Arkell & Smiths, Canajoharie, N. Y., is offering a ten page bulletin on "Palletizing Filled Multiwall Bags." The book is the result of laboratory tests and field checks, and was designed to facilitate the handling, and shipping of bags, with special attention to the problem of adapting bags to fit a given pallet.

•

USI Revises Booklets

The Animal Nutrition Dept., U. S. Industrial Chemicals Co., Div., of National Distillers Products Corp., New York, recently revised and brought up to date its feed products buyers guides, which are designed to assist manufacturers in formulating rations or purchasing feed supplements. The guides contain information on methionine, niacine, vitamin B-12 supplements, calcium pantothenate products, riboflavin products choline chloride and other USI products.

•

Nitrogen Fertilizer Manufacture

The use of filters in removal of graphite, oil, grease particles, paper fibers and dirt from mother liquor in

the manufacture of anhydrous ammonia as a high nitrogen fertilizer is illustrated in an operation at Mississippi Chemical Co., Yazoo City, Miss. The solution is composed of ammonium nitrate water solution and is made up of materials spilled at various points in the process. The filter is used in conjunction with an ammonium nitrate tank in which granular nitrate is dissolved in water. Diatomaceous earth filtered, 15 lbs. per 100 gallons, is added in this tank when necessary to precoat. The Niagara filter is used also in operations at the Phillips Chemical Co., Etter, Texas.

•

New Hand Duster

A new insecticide Spit Duster which can be operated with one hand, leaving the other hand free to move foliage or to hold plants, is available through the distributors of Raw Materials Trading Co., New York.

The dust projection distance is 12 feet, and the duster holds 5¼ ozs. of material equal to 7 minutes of dusting. The weight of the duster, which will find its use among home gardeners, nurserymen, and others, is 5¼ lbs.

Nopco Viscosity Chart

A chart which provides a quick, convenient means of translating any viscosity measurement into seven other standard units has just been released by the Nopco Chemical Co., Harrison, N. J. This conversion nomograph has been designed to minimize the problems caused by the lack of standardization by providing a means of rapidly converting from one system to another.

•

New Peerless Pump Buln.

A new 16-page bulletin which describes the application of Peerless vertical industrial service pumps for liquid transfer from short settings is offered by the Peerless Pump Division, Food Machinery & Chemical Corp., New York. Three production designs are described: the standard service type and the heavy duty service type, for pumping of clear water and alkaline liquids, and the special service type for pumping hydrocarbons, volatile liquids, chemical solutions and other process liquids.

•

InsectoJet Sprayer Described

Spraying Systems, Co., Bellwood, Ill., recently issued a new bulletin (#74) on its InsectoJet Sprayer which is now suggested for use in the dairy farm field. The sprayer is a bottle type unit, operated by compressed air. A simple portable air compresser is used as an air source.

•

Announce Herbicide Bulletin

American Potash & Chemical Corp. recently announced publication of a service bulletin on its product "Tronabor", a borate weed killer. The bulletin adds to information contained in a previously issued bulletin describing Tronabor.

•

GGG-38 Product Sheet Offered

A description of the structure and operation of the GGG-38 bagging scale is contained in a product data sheet recently published by the Richardson Scale Co., Clifton, N. J. The pamphlet includes a detailed description of the scale, a listing of seven spcifications, a photograph of the unit, and engineering drawing.

NEWS Brevities

STAUFFER CHEMICAL CO. recently completed an $800,000 Crystex plant at Monongahela, Penn.

NIAGARA BRAND SPRAY CO., manufacturer of fungicides, insecticides, and herbicides recently acquired Chemical Products Ltd., Western Canada.

* * *

VIRGINIA CAROLINA CHEMICAL Corp., recently elected T. C. Boushall as a director to succeed W. Cabell.

* * *

P. J. PERNICE has been named to head the Portland, Ore., office of Antara Chemicals, sales division of General Aniline & Film Corp.

* * *

IMC's POTASH DIVISION will expand its potassium sulfate producing facilities at Carlsbad, N. M. to 40,000 tons/year capacity. Construction is expected to start immediately.

* * *

FREEPORT SULPHUR CO. plans to build a $16 million potash mine and refinery near Carlsbad, N. M.

* * *

GENERAL E. MONTGOMERY retired recently from his post with Chemical Construction Corp. as assistant to the executive vice president, director of procurements.

* * *

BREA CHEMICALS, INC., Brea Calif., subsidiary of the Union Oil Company of California, has appointed Ronald L. Clark supervisor of market research and development.

* * *

MONSANTO CHEMICAL Co's Texas City, Texas, plant and the Montreal plant of Monsanto Canada, Ltd., last month were named the 1954 winners of the president's trophies, awarded annually by the company for the best plant safety records.

* * *

THE IRAQ GOVERNMENT has placed a $20,000 order for endrin, to be used against the spiny bollworm, which is attacking Iraq's cotton crop. At present the chemical is manufactured only in the United States, but Shell Chemical Co. plans to be producing it at its Pernis Refinery near Rotterdam before mid-1956.

* * *

W. D. MCLEAN, Bemis Bros. Bag Co., will leave this month for India and Pakistan to appraise the jute and burlap supply situation. He plans to attend the annual meeting of the Indian Jute Mills Assoc.

Triangle Brand Copper Sulphate has been recognized as an effective agricultural chemical for more than sixty years. In sprays (where Bordeaux mixtures are the most reliable), in dusts (if you prefer them) and in fertilizers (for additional enrichment of the soil) Triangle Brand Copper Sulphate has proved itself worthy and dependable. Try these Triangle Brand forms of Copper Sulphate:—

INSTANT (powder) for quick and efficient mixing of Bordeaux sprays.

SUPERFINE (snow), SMALL or LARGE CRYSTALS, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

Write for booklets that will help you solve your agricultural problems.

Control POND SCUM and ALGAE with Triangle Brand Copper Sulphate. Write today for information on how it can help you maintain healthy water conditions.

PHELPS DODGE REFINING CORP.
40 WALL ST., NEW YORK 5, N. Y. • 230 N. MICHIGAN AVE., CHICAGO, ILL.

PHELPS DODGE REFINING CORPORATION — NICHOLS — TRIANGLE BRAND — CHEMICALS — 40 WALL ST. NEW YORK

BIDS HAVE BEEN REQUESTED for the supply of 25 tons of insecticides to be used in the cotton areas of the Belgian Congo. The program will be under the direction of the managing committee of the Cotton Reserve Fund.

* * *

NOPCO CHEMICAL CO., Harrison, N. J., has announced the appointment of Ralph W. Uster as a district sales manager of the agricultural department of the company's Vitamin Division.

* * *

MURRAY OWEN was recently selected to replace H. C. Little as director of employee relations at American Cyanamid Co., New York. Mr. Little has moved up to assistant general manager of the Agricultural Chemicals Division.

* * *

HAROLD FERGUSON, formerly vice president of the Naco Fertilizer Co., was recently appointed senior assistant to Dr. R. E. Neidig, vice-president of the fertilizer and chemcal department of Balfour, Guthrie & Co., Ltd., San Francisco.

* * *

MEXICO plans to increase its fertilizer production through construction of an anhydrous ammonia plant at Coatzacoalco, installation of facilities at the Monclova steel mill to recover byproduct ammonium sulfate, and expansion of present ammonium sulfate capacity at Cuautitlan.

* * *

ARWELL, INC., Waukegan, Ill., announced last month the appointment of Robert Brooks as manger of its newly established product and equipment division. Alfred Agne was named advertising manager.

* * *

LAWRENCE R. GARDNER has been named purchasing manager for Commercial Solvents Corp., New York. Mr. Gardner has served with American Marietta and Monsanto Chemical Co.

* * *

AMERICAN SPRAY OPERATORS have been invited to submit bids for a weed control operation in Turkey by the directorate of Turkish State Farms.

GEORGE H. SERVISS, agronomist for the G. L. F. Soil Building Service, Ithaca, N. Y., has been elected 1955 chairman of the American Chemical Society's Division of Fertilizer and Soil Chemistry, succeeding Jesse D. Romaine, secretary and chief agronomist of the American Potash Institute.

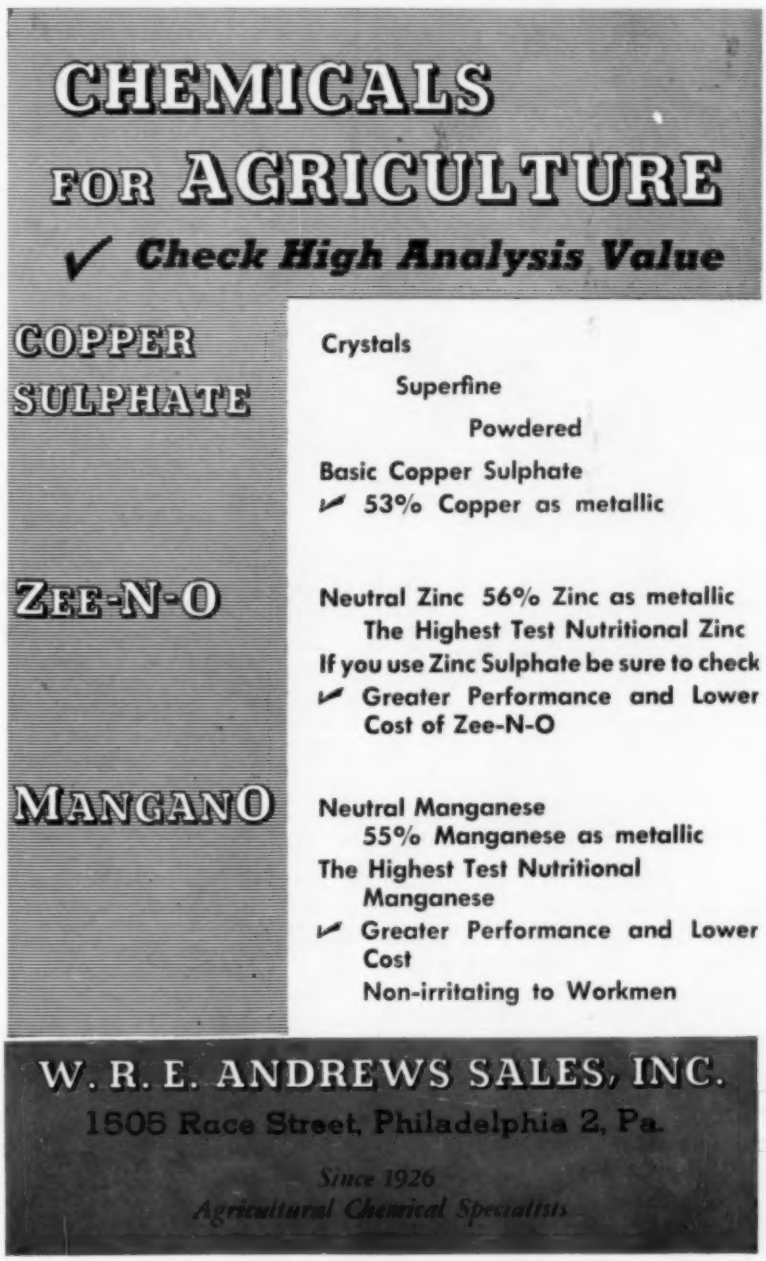
* * *

THE CARAC FLORAL CO., INC., New York, started the new year with a new name, "The Carac Corp." and new headquarters at Freeport, N. Y.

CHARLES ALBERT SMITH, LTD., Toronto, was designated exclusive representative of Emulsol Chemical Corp., Chicago, for the Dominion of Canada, effective January 3.

* * *

GILBERT E. GOHEEN has been appointed assistant chief of the Southern Utilization Research Branch of the U. S. D. A Research Service. He was previously director of research and development at the J T. Baker Chemical Co.



AMERICAN POTASH INSTITUTE announced that R. P. Pennington succeeds E. K. Hampson who retired recently from his post as Canadian manager of the American Potash Institute local branch.

* * *

ROBERT E. HULSE, vice president in charge of chemical operations for National Distillers Products Corp., was recently elected to the company's board of directors.

NH_3 PRODUCTION

(*From Page 25*)

field, but prepared to convert to other forms more readily saleable in the world market, express little concern even in the face of steadily rising domestic output. They indicate that at least part of the excess of American nitrogen will simply move into the world market where there are still plenty of buyers.

For full killing power, your dusts and sprays need the right physical properties — to absorb and disperse the toxicant thoroughly — to make them cling, cover, and stick in doing their deadly work. Vanderbilt carriers, diluents, and dispersing agents are *specially developed* to give dusts and sprays these important physical properties that mean more efficient coverage and increased lethal effectiveness in the field.

PYRAX ABB
The most widely used pyrophyllite in agriculture. Adheres electrostatically to dry foliage. Ideal for aircraft dusting.

DARVAN #1 & #2
Outstanding dispersing agents. Produce increased toxicant effectiveness through better dispersion of wettable concentrates.

CONTINENTAL CLAY
Superior nonalkaline carrier for high-bulk dusts and wettable concentrates, remarkable for dispersability, absorption, and flowability.

When you choose Vanderbilt products, you can be sure your dusts and sprays have the right physical properties to make them cover, cling, and kill with full effectiveness.

USE THIS HANDY COUPON →

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SPECIALTIES DEPARTMENT
230 Park Ave., New York 17, N. Y.
Please send Bulletin 23D and samples
☐ PYRAX ABB ☐ DARVAN ☐ CONTINENTAL CLAY
NAME_____
POSITION_____
(Please attach to, or write on, your company letterhead)

COTTON STATES ESA

(*From Page 95*)

lindane upon the cotton aphid, *Aphis gossypii* Glover. Each formulation was tested alone and in mixture with five per cent DDT at a rate of 20 pounds per acre. Infestation counts were made before treatment and at 24-, 48-, and 96-hour intervals after treatment. All of the formulations gave satisfactory control, with very little difference in their effectiveness.

R. L. Robertson and F. S. Arant, Alabama Polytechnic Institute reviewed the effect of certain acaracides on two species of spider mites on cotton in Alabama. They reported that three per cent and five per cent Aramite, three per cent chlorthion, five per cent malathion, three per cent methyl parathion, and one per cent parathion applied as dusts are more effective in controlling the desert mite, *Tetranychus desertorum* Banks than sulfur. Sprays are effective when applied at the following rates per acre: chlorthion 0.5 pounds, demeton 0.25 pound, malathion 0.50 pounds, methyl parathion 0.25 pounds, parathion 0.25 pounds, and ovotran two pounds. Hercules AC-528 and all the sprays used against desert mite are satisfactory against the strawberry mite.

Drs. Robertson and Arant also presented data on laboratory experiments on the effect of Bayer 17147 on boll weevil, reporting a 100 per cent mortality by the end of 24 hours of all weevils exposed to the residues of Bayer 17147 on the leaves of the plants treated at 10 and 20 pounds per acre, for as many as eight days after the insecticides were applied. Bayer 17147 was more effective than toxaphene both in the initial kill and in the potency of residues.

"The Effect of Various Formulations and Methods of Application of Certain Organic Insecticides on Wireworms Attacking Sweetpotatoes," was reported by Lacy L. Hyche and W. G. Eden, Alabama Polytechnic Institute: Aldrin, dieldrin, heptachlor and lindane applied in dilute dust and granular formulations, and as broadcast treatments and in-

secticide-fertilizer mixtures were about equally effective where injury was light. At locations where wireworm injury was severe, granular broadcast applications were slightly but consistently the most effective.

At the final session of the conference L. C. Kuitert, Florida Ag. Exp. Station, discussed the effectiveness of demeton for controlling ornamental pests. Mr. Kuiter advised that demeton is extremely effective at low concentrations in controlling aphids and whiteflies, but ineffective against lepidopterous larvae or other chewing pests. It can be applied successfully to ornamental plants without causing any phytotoxic reaction.

The program for the conference was arranged by chairman C. M. Beckham, Experiment, Ga. and committee members Walter M. Kulash, Raleigh; Carroll N. Smith, Orlando, Fla.; K. D. Quarterman, Savannah, Ga.; and A. N. Tissot, Gainesville, Fla.★★

SPRAY OPERATORS

(*From Page* 37)

used in several states in legume stands. It should be available commercially in 1955 on a very limited basis.

2. TCA, which has given some good results on weeds in legume stands.

3. Maleic hydrazide, which has given practical control on quackgrass.

4. CMU, a soil sterilant, has given some promising results in the control of weeds in corn when used as pre-emergence spray. It also has been used for weed control in orchards and in gladiolus and asparagus plantings and for Johnson grass and oak brush control.

5. Amino triazole, which may be the most important chemical yet for Canada thistle. It has shown promise for quackgrass.

6. IPC, which is not new but which has been found useful in a new way. Put on in October in North Dakota, it was effective in the control of wild oats.

7. CIPC, which also is not new, has been found effective in smartweed and purslane control in commercial onion plantings.

8. Dinitro, which is another well-known one, has been found effective on weeds in corn when used just as the corn pushes through.

9. Silvex, which has found a new use in the control of oak trees.

L. H. Hannah of the Monsanto Chemical Company reported excellent results in pre-emergence spraying of corn for both grassy and broadleaved weeds from a new family of herbicides which he called alpha-chloroacetamides. He said they were effective on grasses among a wide range of field and horticultural crops and cause little crop damage. The chemicals were also effective against broadleaved weeds and were not affected greatly by variations in rainfall. They were also effective on heavy clay soils as well as high organic matter soils. The new materials, Hannah reported, were tested in the

Show your customers the way to "Greener Valleys" with

FLINT NH3 TANKS

EASIER TO SELL BECAUSE THEY'RE EASIER TO USE!

Only one, quick adjustment is needed for even flow of anhydrous from the *new* FLINT NH3 TANK. Fittings are open, easily reached for finger-tip pressure control yet *protected from damage* by FLINT's distinctive red combing. Your customer will spend less time and effort in refilling too, because FLINT NH3 TANKS have 85% usable capacity. Heavy steel plate, careful welding and inspection by a *National Board Inspector* plus exclusive FLINT designing mean each FLINT NH3 TANK has *longer service life and withstands damage* from bumps, shocks and other sources. Completely weather-proofed and built to meet every state requirement and code for 250# psi working pressures. Shipped dry and complete with NH3 pressure gauge; positive hand shutoff valves on vapor filler and liquid outlet.

AAI

Write for Sales Aid: "THINGS TO LOOK FOR WHEN PURCHASING ANHYDROUS AMMONIA TANKS FOR RESALE TO THE CUSTOM APPLICATOR OR FARMER"

APPLICATOR TANKS	100 gal.	157 gal.	200 gal.
	236 gal.	310 gal.	500 gal.
FARM SERVICE TANKS	500 gal.	1000 gal. in 28" - 41" and 46" diameter	
BULK STORAGE TANK	6000 gal.	18,000 gal.	30,000 gal.

FLINT STEEL CORPORATION

MEMPHIS, TENNESSEE

P. O. Box 3155 Phone 9-3558

Midwest, Southeast, and Northwest, on more than 2700 plots. They will not be available, however, this year.

University agronomist Fred Slife reported that after three years research, the best weed chemical for soybeans is one-eighth pound of 2,4-D amine to the acre on soybeans three to five inches tall. This is heavy enough to kill many weeds and to stunt others, and the chemical won't damage soybeans at this stage. Mr. Slife said this spray will be of most benefit in the bottomlands. In ordinary situations, seedbed preparation and cultivation are the most reliable means of controlling weeds in soybeans.

Insecticide Tests Reported

C. W. Kearns, University entomologist, reported few new insecticides developed during the past year. Much work is being done on the organic phosphates, and some experimental compounds are being tested with some promise, but none are on the market. The problem of insecticide-resistant houseflies and mosquitoes is still unsolved, he reported.

Nat. Hist. entomologist J. H. Bigger gave an optimistic report on the use of insecticides in the soil. In fairly extensive tests of aldrin, heptachlor, dieldrin, endrin, and lindane it was found that control of root feeding insects was excellent in most cases. However, he reported, materials put in the soil must be covered at once. A delay of three to four hours between the time aldrin and heptachlor were sprayed and disked in reduced their effectiveness by half.

Dr. Bigger reports that entomologists are recommending the use of soil insecticides as insurance. Either aldrin or heptachlor, at the rate of a pound and a half to the acre when broadcast or a pound when banded or hill dropped, is proving satisfactory.

Johnson Quack Grass Report

D. L. Klingman of the U. S. Department of Agriculture reported that prevention is the best control for Johnson and quack grass. Chemicals, he said, are expensive and best used in small patches. Dalapon, a new chemical, is showing some promise, he said, but it isn't recommended. It is similar to and a little better than TCA, an effective chemical. He also listed close grazing and clean cultivation as control measures. Maleic hydrazide followed by plowing has been effective in quack grass control.

Norman Gannon, Natural History Survey entomologist, reported that although D D T didn't kill armyworms, apparently it was an effective control because the worms stopped feeding. Tests showed that other insecticides — toxaphene, dieldrin, and endrin—actually killed the worms. Toxaphene or dieldrin were recommended for commercial practice.

Gannon also reported that a half pound of dieldrin to the acre put on by plane last summer as chinch bugs moved into wheat eliminated the danger at that time and kept the bugs from developing in those fields to threaten adjacent fields later.

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For chinch bug control, he explained, an insecticide must not only be effective against the insects, but it must also have the ability to remain effective through the migratory period. Only endrin and dieldrin had this quality. Parathion was good at first, as was BHC, but neither lasted very long.

L. L. English, survey entomologist, reported that getting complete coverage of the tree is one of the biggest problems in fighting the worst elm insect enemies. Scale insects, bark beetles, mites, and leafhoppers are very small and occur in heavy numbers. You have to cover the tree completely to do much good, he said, . . . and on large trees every condition needs to be perfect to do that.

Another problem, he said, is that DDT does kill off some of the natural enemies of insects other than the ones which carry phloem necrosis and Dutch elm disease, and these insects then develop into a pest.

The third problem is the timing of the sprays for the disease or insect expected. It's not wise to spray without a definite purpose, and if you wait until you can see the need it's often too late.

Above, left: J. H. Bigger, center, entomologist, Illinois Natural History Survey, Urbana, answers questions after his talk on "Results with Soil Insecticides". Left to right, John Abbott, Ashkum Fertilizer Co., Ashkum, Ill., John Patterson, Associated Pfister Growers, Davenport, Iowa, Mr. Bigger, Dick Yero, Libby, McNeill and Libby Canning Co., Blue Island, Ill., and Ronald Fix, Illinois Canning Co., Hooperston, Ill.

Right: Dean Roy, Dow Chemical Co., discusses a question with Will Powell, Dobson-Hicks Co., Nashville, and Bert Brayton, Brayton Chemicals Inc., Burlington, Iowa, seated: and standing Ken Cole, K. G. Cole Chemicals, Springfield, Ill., and Lloyd Hahn, Hahn Inc., Evansville, Ind.

Below, left: Fred Slife, Assistant Professor of Agronomy, University of Illinois College of Agriculture, center, checks over the "Abstracts of Presentations" with Walten Smith, Riverdale Chemical Co., Harvey, Ill., Frank Honegger, Honegger's Hatchery, Forrest, Ill., and standing, R. O. Hall, Hall Chemical and Spray Service, St. Charles, Ill., and Joe Garland, Garland's Spray Service, Amboy, Ill.

Right: Jacqueline Hansgen, helps with registrations at the Seventh Illinois Custom Spray Operators Training School. Registering are (l. to r.) William Cole, Illinois Farm Supply Co., Chicago, W. O. Scott, extension agronomist, University of Illinois, College of Agriculture who helped with the program, Eugene Hoffman, ground sprayer, Farmer City, Ill., and Haskell Tison, Geigy Chemical Co., St. Charles, Ill.

J. H. Bigger, Survey entomologist, warned against delay in treating for spittlebug and clover leaf weevil. He even recommended fall treatment for the two insects, since it is easier and more economical.

Dr. Bigger also warned that soybeans are past their insect-free status and have been grown so long that we can expect their insect enemies to be more important in the future.

D. L. Klingman, U.S.D.A. weed specialist, reported that tests to date give no basis for recommending either the low volatile ester form of 2,4-D over the high volatile ester form or vice versa. In about half the tests reported so far there was no difference between the forms. In the remaining 50% results were generally inconsistent . . . sometimes the low volatile form seemed to give better results, while in other cases the high volatile form might be preferred.

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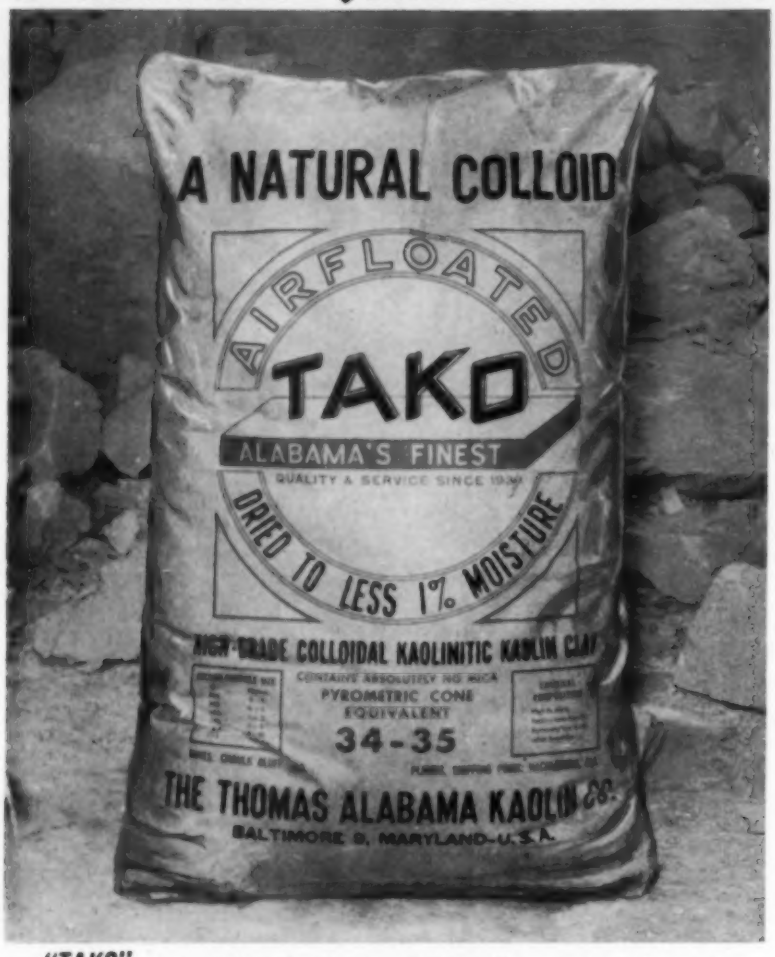

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J. H. Bigger said control recommendations for corn borer are little different from those in the past, although large scale experiments will be tried in Illinois this year with granular DDT. Excellent results were reported from the use of this form in Iowa in 1954, he said.

Robert O. Hall, custom sprayer from St. Charles, Illinois, who has had several years' experience in fly control programs for dairy barns, listed three steps in a successful program.

1. Fly control is impossible without clean up and sanitation.

2. A residual spray, one that will effectively control houseflies is also necessary. Malathion, at four and half pounds technical, 20 pounds of beet sugar, and 50 gallons of water is suggested with a thorough spraying. Two applications may be adequate.

3. It is necessary to use a spray on the cattle. Activated pyrethrum concentrates undiluted, misted over the backs of the animals and along their sides produce good results.

University agronomists reported that as far as crops and soil reactions are concerned there is little difference between liquid fertilizers and ordinary fertilizer. If liquids are sprayed on the ground surface, it has to be disked in the same as ordinary fertilizer.★★

BOLLWORM MENACE

(*From Page* 49)

mites and all the others, and the outlook is not too bright. Control operations become more complex and costly, and the quality as well as the quantity of the cotton products goes down.

The rapid spread of the pink bollworm during the last few years has emphasized the urgent need for additional and more effective control measures. A more intensive and extensive research program was obvi-

ously required to find such measures. The then Bureau of Entomology and Plant Quarantine took steps to expand its work in this field in 1952. The National Cotton Council also started action to get the various State Agricultural Experiment Stations to supplement the funds being provided by the U. S. Department of Agriculture and the Oscar Johnston Cotton Foundation for pink bollworm research. This effort resulted in Texas, Arkansas, Georgia and Alabama joining in a coordinated research program in 1953, and Mississippi and Louisiana adding further funds to be devoted to this end in 1954.

The U. S. Department of Agriculture scraped up funds to initiate the construction of an up-to-date research setup in Brownsville, Texas. With the aid of funds from the several agencies mentioned, the personnel has been supplemented and a well rounded though still incomplete, research program is going forward, closely coordinated with the Department's Pink Bollworm Control Project and the work of the State Departments of Agriculture.

The facilities at Brownsville include a 26-room office and laboratory building, a building housing 5 bioclimatic cabinets, a greenhouse, insecticide building, a half acre screen cage, garage and shop; also a small acreage for cage and plot work.

The major lines of work are biological and ecological investigations, including life history, hibernation, seasonal abundance, flight studies; studies of the physiology, morphology, and host plants of the insect; biological control through the introduction and colonization of foreign parasites and predators; search for resistant cotton; screening and practical tests of insecticides; investigations of the relation of defoliants and desiccants to pink bollworm control; studies of the effect of various types of radiant energy on several stages of the pink bollworm; investigation of methods designed to kill the insect in the ginning and milling processes; and work on the development of field equipment to destroy the larvae in crop residues.

A well rounded research program designed to meet, as rapidly as possible, this serious threat to the cotton industry demands the participation of workers in the various sciences which contribute to the solution of an entomological problem of this magnitude. Such cooperation has been forthcoming and greater participation is expected in the future.★★

VEGETABLE CONFERENCE

(*From Page 47*)

800 lbs. per acre or methyl bromide at 2 lbs. per 1,000 sq. ft. (under tarps) although neither of these treatments is recommended by the experiment station workers. Parathion residues on fruit are too high, and methyl bromide causes plant injury.

The strawberry crown moth is reported as being a pest at times in Oregon and Washington. Work on this pest in Washington was interrupted this season by unseasonable rains, and the control from materials used—while considerable—was not sufficient to be called commercial control. Oregon work with residual soil insecticide against this pest was not successful.

Strawberry root weevils were controlled by soil applications of aldrin, heptachlor and dieldrin in northwest Washington. Rates used were 3½ and 5 lbs. of technical material per acre, and gave adequate control of the smaller strawberry root weevil. Rates of 7½ lbs. per acre were needed to kill the larger species of weevils. Work done in Oregon gave results quite similar to those mentioned for Washington.

Effective control of tent caterpillars by the use of malathion or methoxychlor wettable powders was reported from western Washington.

Officers elected for the 1956 meeting were chairman—A. J. Walz, University of Idaho, Parma Branch Exp. Sta.; co-chairman Merton C. Lane, Entomology Research Branch, Ag. Research Service, Walla Walla, Wn. and secretary David H. Brannon, WSC, Pullman, Wn. Dates set for the 1956 meeting are January 16, 17, 18 at the Imperial Hotel, Portland, Oregon.

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TABLE 2

Effect of different fungicides on emergence and seedling blight in Red Bobs wheat in infested greenhouse soil, on emergence in the field, and on bunt control at five stations in 1954.

Seed Treatment Applied				Percent emergence		Pct. seedling blight	Percent of heads infected at					
No.	Material	Form	oz./bu.	Green house	Field		Beltsville, Md.	Blacksburg, Va.	St. Paul Minn.	Madison, Wis.	Pullman, Wash.	Average infection
1.	Check	—	—	90	79	34	23.2	5.6*	9.7*	8.6*	80.0	25.42
2.	Panogen 15 S	liquid	¾	94	90	16	0	0	0	0	0	0
3.	Panogen 42	"	¼	96	91	16	0	0	0	0	0	0
4.	Dupont 244	"	¾	97	89	13	0	0	0	0	0	0
5.	Dupont 364	"	½	96	83	12	0	0	0	0	0	0
6.	MEMA	"	½	94	90	12	0	0	0	0	0	0
7.	MEMA	"	¼	95	84	12	0	0	0	0	0.3	t
8.	Setrete	"	½	94	84	9	0	0	0	0	0.2	t
9.	Ceresan M	slurry	½	95	84	16	0	0	0	0	0.6	t
10.	Ceresan M-2-X	"	¼	97	86	13	0	0	0	0	0	0
11.	Check	—	—	92	79	36	21.1	64.1	30.1	15.4	80.0	42.16
12.	Pura C-13-1212	"	½	95	86	12	0	0	0	0	0	0
13.	Pura-C-14-66	"	½	93	88	13	0	0	0	0	0	0
14.	Mergamma	"	1½	89	83	15	0	0	0	0	1.2	0.24
15.	Agrox	"	½	96	82	13	0	0	0	0	0.6	0.12
16.	Anticarie	"	½	92	78	26	0	0	0	0	0.6	0.12
17.	Tristan	"	2	91	81	25	0	0	0	0	3.0	0.60
18.	N. P. 1083	"	2	39	64	20	0	0	0	0	0.3	0.06
19.	Cu CO3	"	2	92	82	21	0	0	t	0	0.6	0.12
20.	B. Cu SO4	"	2	94	82	29	0	0	0	0	1.2	0.25

*These checks were "treated" in shipping due to lack of "insulation" from Panogen-treated seed.

TABLE 3

Control of loose and covered smuts in Canadian spring oats grown from naturally infected seed treated as shown and grown at five stations, 1954.

Seed treatment				Percent smut recorded at					Average Infection
No.	Material	Form	oz./bu.	Blacksburg	Madison	Urbana	Fargo	Pullman	
1.	Check	—	—	29.2	10.2	24.1	17.1	20.3	20.18
2.	Panogen 15	liquid	¾	0.3	0	0.1	0	0	0.08
3.	Panogen 42	1	¼	0.2	0.3	0	0	0.3	0.16
4.	Dupont 244	1	¾	0.6	0.2	1.2	0.5	0.3	0.56
5.	Dupont 364	1	½	1.1	1.0	1.9	1.5	1.2	1.34
6.	MEMA	1	¼	0.3	0.4	0.4	0	0.2	.26
7.	Check	—	—	29.2	8.1	22.0	10.9	10.3	17.90
8.	Setrete	1	½	3.1	0.2	2.2	0	0.8	1.26
9.	Ceresan M	slurry	½	0	0.2	0.2	0	0	.08
10.	Ceresan M2X	slurry	¼	0	0.2	0.3	0.5	0	.20
11.	Puraseed	slurry	½	0.7	0.2	0.4	0	0	.26
12.	Pura 14-66	slurry	½	3.6	0.3	2.1	1.5	2.6	2.02
13.	BB-350-37	1	½	0.4	0	1.3	t	0.2	.38
14.	BB-350-37	1	¾	0.4	0.3	0.8	0	0.5	.40
15.	BB-350-34	1	¾	0.5	0.1	1.8	0	2.8	1.04
16.	Ethyl corp. 856	slurry	½	—	—	18.2	—		—
17.	Ethyl corp. 856	slurry	1	—	—	24.2	—	—	—

Printed abstracts of Research from the meeting were made available to the group by the Western Agricultural Chemicals Assn. A limited number of copies are still available at $1.00 each from Mr. C. O. Barnard, Secretary-Treasurer, Western Agricultural Chemicals Assn., 2466 Kenwood Ave., San Jose, Calif.★★

WEEVIL INFESTATION

(*From Page 59*)

over 500 borers per 100 plants as compared with 11 counties in 1953.

The Eastern United States grouped as a whole showed a substantial decrease over the previous year. In 1954, the average number of borers was 33 compared with 65 per 100 plants in 1953. The only states in this group which showed an increase over 1953 were Massachusetts and New Hampshire and these were not necessarily significant. In the Eastern area, only a few counties had counts of over 100 borers per 100 stalks.

Comparable data for all the states surveyed showed an increase from 104 borers per 100 plants in 1953 to 186 in 1954. It might be of interest to review the comparable populations recorded for surveys conducted since 1948. In 1948 the average was 95; 1949—283; 1950—80; 1951—63; and in 1952—72.

It should be kept in mind that weather factors will play an important part in the final development of the 1955 European corn borer populations. Field losses in 1949 following the average fall hibernation population of 95 were estimated to be $350,000,000 whereas in 1950 following a fall hibernation population of 283 estimated losses dropped to $85,000,000. The present population in the North Central states could mean serious trouble for the 1955 growing season and the situation should be watched carefully.★★

SMUT CONTROL

(*From Page 56*)

29.2 per cent in plants from untreated seed, and from 0 to 3.6 per cent from treated seed (with the exception of the one ineffective material tested at Urbana). Out of 13 treatments, nine reduced the average infection to less than 0.6 per cent. The Ethyl Corporation-856 material appeared to be relatively ineffective.

NE WEED CONFERENCE

(*From Page 40*)

its limitations, it will perform satisfactorily and do the job for which it is designed.

A review of equipment available for applying soluble emulsions and wettable powders by E. D. Markwardt and W. W. Gunkel, Cornell University, Ithaca, N. Y., points out that among the mechanical needs of the industry are a mechanical agitator for tanks that could be easily mounted on a barrel and would not be too expensive. They indicated also that kits for attaching nozzles or small booms to planters, cultivators, etc. would be a welcome addition to the equipment line. Still another equipment item needed by the chemical applicator is a small reasonably priced pump that can be quickly and easily mounted; will handle wettable powder sprays as well as solutions and emulsions; will develop fairly high pressures; and has a good capacity. Other problems considered in this discussion were tank corrosion, spray pressures, and pump design.

Three points of discussion elaborated by Mr. Minshall were: (a) where are the target areas for CMU? (b) What are the symptoms? (c) What deductions regarding mode of action can be made?

Results from work with bean, tomato, spinach, corn, and barley plants indicated that the primary target areas of CMU are either in close proximity to, or a part of, the water conducting tissues of plants. CMU readily penetrates roots and has quick access to the vascular system. Transport is acropetal and is passive in the transpiration stream.

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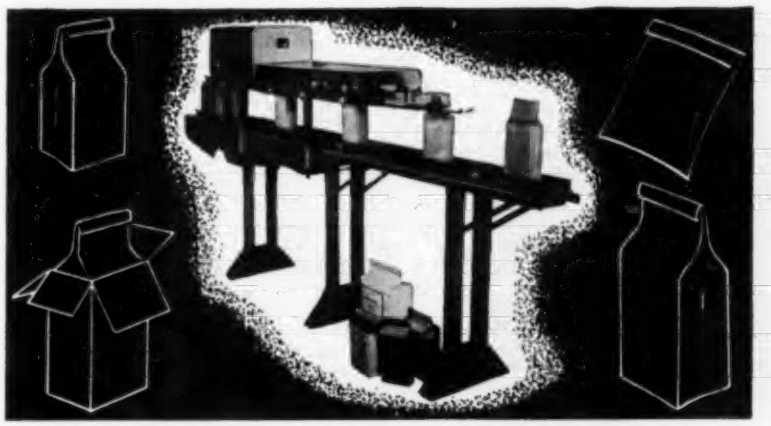

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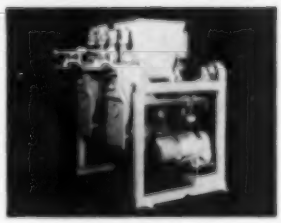

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Five different symptoms of CMU effects were listed: (1) necrotic blotching (three types: regular, irregular grey, and glazed); (2) wilt; (3) stem collapse; (4) partial bleaching of leaves; and (5) rapid yellowing and abscission of leaves. Because of loss of water from plants by transpiration and its replenishment from the soil, CMU accumulates in the tops of plants, producing necrotic symptoms.

Since the start of visible symptoms marks the endpoint of toxic action at site of activity, only fragmentary information on mode of action is available.

Leaf blotching, the CMU effect most commonly responsible for the death of plants in these studies, appeared to develop from a direct action of the chemical at cell surfaces, resulting in the destruction of cellular membranes and the leakage of cell contents to form water-soaked areas.

Mr. Minshall presented 37 kodacolor slides illustrating the symptoms described in his paper.

Committee chairmen for the ninth annual conference were as follows: program, W. W. Smith; coordinating, L. L. Danielson; publications, R. J. Aldrich; sustaining membership, C. L. Hovey; public relations, R. A. Peters; and awards, R. H. Beatty.★★

STATION NOTES

(*From Page 55*)

insects. Fortunately, the insect life cycle usually has several stages and it has been possible to use a sequence of parasites and predators for destruction of the several immature stages and even the adult. Much credit is due the founders of applied entomology for their appreciation of the value of insect ecology to the science of applied entomology.

Chemicals for Direct Control

PESTICIDAL chemicals have provided the farmer with direct weapons to fight insect enemies. It is understandable that entomologists in the experiment stations throughout the nation have been anxious to develop control measures for insect

pests that were not subject to the complexities of natural control measures, since in modern agriculture it is not always possible to manipulate environmental factors—even if they are known, to bring about insect control. Many aspects of applied ecology were replaced by chemical control, and with the impetus of the entry of the vast array of synthetic organic insecticides into the field, it appeared that chemicals might logically take over the entire job of control. Such a thought, however, was short lived, because the insects fought back. Resistance to chemicals, outbreaks of species heretofore of minor importance, destruction of established measures of biological control are all too familiar side effects from the use of modern insecticides. The need to get information to growers has kept many professional entomologists busy with field and laboratory testing of new insecticides. The accusation has been made, with an element of truth, that too many workers have spent their recent years testing insecticides without an opportunity to make contributions of lasting value to the profession. The big question facing many experiment stations and universities is how to keep up with practical work that establishes current recommendations for growers, and yet regain and expand the programs of fundamental work that will contribute future benefits to agriculture and public health. It seems reasonable to expect that industry will not do much of the work in the fundamental fields of entomology.

Increased Need for Basic Research

PERHAPS no single event has awakened applied entomologists to the need for a better understanding of insect biology and ecology than the rise of new pest species of mites and insects where natural balances have been disturbed through the use of new insecticides. The quandary is real; can we curtail part of our field testing programs for the sake of expanded entomological investigation; can we sharpen our techniques to get answers about new chemicals that will save time over present methods; old field plot techniques are inadequate in appraising differences between several effective insecticides—what should we do; should the experiment stations leave more of the responsibility for proving new pesticides in the field to industry or should it be a joint responsibility; should industry eventually provide more liberal support for university and experiment station programs in fundamental entomology similar to its fellowship programs in support of basic chemistry and physics—these and a host of other questions arise for discussion when interested entomologists get together. There are no set answers even though there are some very definite opinions!

Somehow, while maintaining responsibility to agriculture today, experiment stations must also find a way to support work of a long term, fundamental nature on the problem of insect population dynamics. Current insecticide advances may offer aid on the one hand. For example, chemical furrow treatment, soil broadcast treatment and seed dressing are becoming accepted practices for control of seed maggots, rootworms, wireworms and grubs. Chemical grain protectants offer similar preventative measures against stored grain insect losses. Certain of the systemic insecticides offer promise for population decreases without destruction of beneficial species. Still other application schedules are sufficiently proven and reliable to enable entomologists to take a change of pace for the time being and pick up some of the neglected

1953

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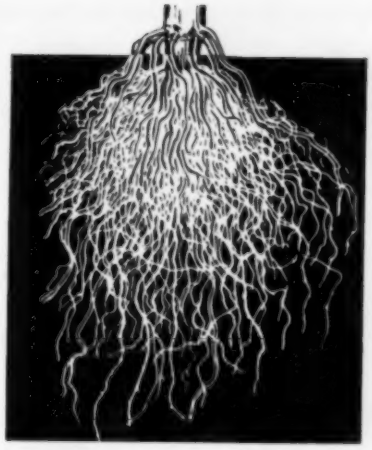

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phases of basic research that may aid in the solution of problems arising from the use of chemicals in the environment.

Natural and Chemical Pest Control

SINCE we are so well aware of the question of peaceful coexistence between people of the earth who hold opposite ideologies and political philosophies, perhaps the entomologist might be excused in borrowing the phrase for the moment to see whether co-existence is possible between natural and chemical control of insect populations. Fortunately there is great hope that such may be the case. To express it another way, through an understanding of natural factors in the environment, we can use chemicals wisely and effectively to supplement rather than destroy the controls that nature has established. We are witnessing ample demonstrations every year in numerous parts of the world that such practices will work — in fact, are working in limited areas. Screening candidate insecticides and fungicides for their effect on natural enemies of insect pests is another important criterion that will be added to the expanded list already being investigated. Support must be found for ecological and physiological research to enable the greatest usefulness of chemical research. There is no doubt in the minds of many entomologists that the most sensible approach to insect control in the future is to let nature carry its share of the burden and to supplement it with chemicals, effectively and wisely used under man's direction.★★

GRACE NH_3 PLANT

(*From Page 34*)

is standard in other processes. Use of the ejector affords a number of process advantages which are said to include: substantial reduction in cost of installation, higher product yields, and elimination of oil contamination.

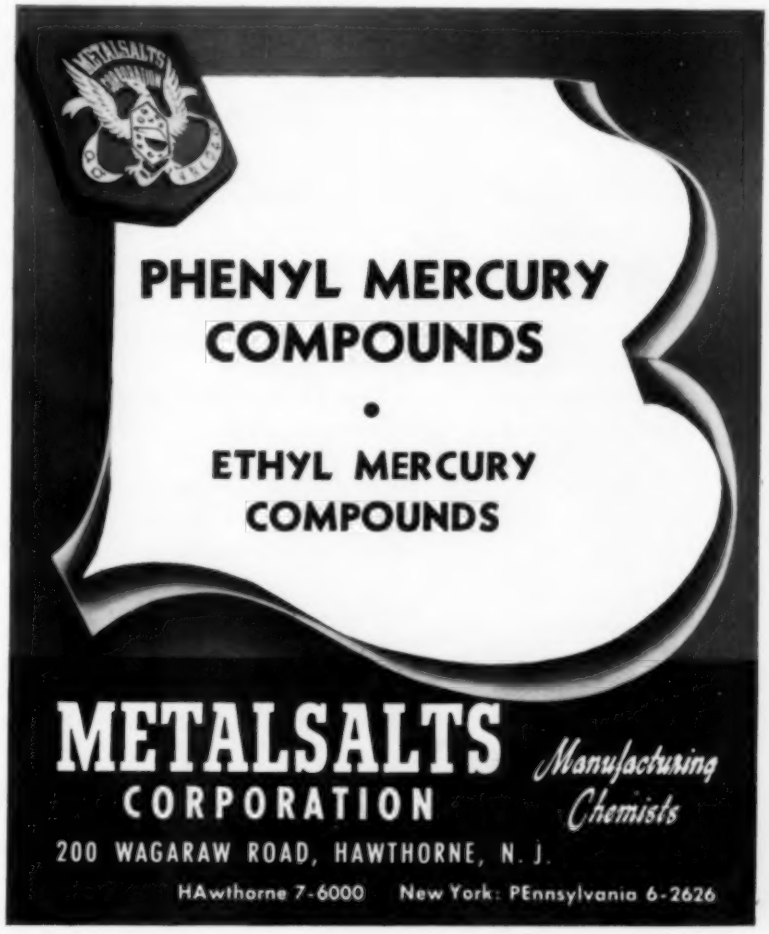
The Pechiney process, originated in the Pechiney urea plant at St. Auban, France, offers an economical means for production of this material, as corrosion is kept at a minimum, thus reducing maintenance charges. In the Pechiney process, corrosion is largely avoided by carrying out most of the processing steps at relatively low temperatures and pressures. At the same time, the process gives a pure, high quality urea for both the fertilizer-grade as well as the higher purity grade for use in the plastics and protein industries.

Foster Wheeler Corporation, New York, who have installed plants using some or all of these three processes for Pennsylvania Salt Manufacturing Company, Spencer Chemical Company, Deere and Company, Cooperative Farm Chemical Associates and Conselho Nacional de Petroleo Brazil, supervised construction of the new Grace plant, which employs the complete Foster Wheeler processing sequence. It is the largest such anhydrous ammonia-urea plant which Foster Wheeler has designed.

To manage and operate the new plant, Grace has selected a team of experienced men from the agricultural chemical industry. William T. Gage, who was formerly vice-president in charge of manufacturing for Shell Chemical Corporation is president of Grace Chemical Company. Charles E. Wilson, formerly president of General Electric and chairman of the executive committee of W. R. Grace and Company is chairman of the board of Grace Chemical.

John G. Carriere, formerly manager of the Hanford Works of the Atomic Energy Commission, is plant manager at Memphis. William J. Haude, formerly president of the Pittsburgh Agricultural Chemical Company, is vice-president of Grace Chemical in charge of marketing.

Principal speaker at the formal dedication program in ceremonies at the plant, January 6, was Samuel W. Anderson, Assistant Secretary of



With an aeration system grain in flat storage such as this can be effectively fumigated with Pestmaster Methyl Bromide.

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Commerce. At a reception and dinner at the Memphis Country Club which followed the dedication ceremonies at the plant, Charles E. Wilson gave the principal address.★★

GRAIN FUMIGATION

(*From Page 42*)

975 cfm resulted (=0.0201 cfm/bushel). In the third at 1600 rpm and the damper wide open, a flow of 1542 cfm resulted (—0.0317 cfm/bushel).

The same load of shelled corn was used for each test, but the corn was thoroughly aerated between fumigations by operating the recirculation system with the top end of the return duct disconnected so as to discharge into the open air.

All three fumigations were with a dosage of 12.8 ounces/1000 cu. ft. (one fifty-pound cylinder of methyl bromide per test) for an exposure period of 24 hours. Readings of gas concentrations were taken at ½, 1, 2, 4, 8, and 24 hours. The amount of gas remaining during the ventilating period was checked at ½, 1, 2, 4 hours and the day following.

Results

THE data on distribution of methyl bromide in the grain, and the concentrations remaining after various periods of aeration are given in tables 7 to 9.

The distribution was fairly uniform in all three tests, indicating that there was little difference in distribution resulting from the three air flow rates used. An area of poor distribution was evident near the bottom of the tank, near the north wall at the 95-foot level, and near the north and west walls at the 115-foot level. This was probably due to the pattern of air flow rather than to the rate of air flow, since low concentrations resulted in each test. The single air pickup point in the hopper is thought to be responsible for this pattern, and attempts will be made in future tests to arrange a wider area of air pickup at the bottom of the tank.

The methyl bromide was readily removed from the tank of shelled corn with a nominal amount of aeration.

Discussion

THE results presented above demonstrate several important points: (1) rates of air flow comparable to those commonly used in grain aeration systems promote satisfactory distribution of methyl bromide throughout bulk grain, (2) the recirculation method of applying methyl bromide can be utilized in silo-type grain elevators where the column of grain is 130 feet or more deep, or in flat bin storages similar to the ships' holds, (3) fumigation can be completed within 25 hours, and (4) the fumigant remaining at the end of the fumigation can be removed from the grain by use of this system.

There are several deductions that can also be made from these studies: (a) the recirculation method will undoubtedly produce satisfactory distribution of any of the other fumigants commonly used on grain, (b) the cost of fumigation can be materially lowered, since it is evident that methyl bromide at a dosage rate of 1 to 2 pounds per 1000 cubic feet will be a saving over fumigants now in common use at dosage rates of 2 to 5 gallons per 1000 bushels, or better distribution of any of the common fumigants will permit substantial lowering of their dosage rates, (c) the efficiency of fumigation will be materially raised, as proper distribution should result in complete mortality of all stages of the insects present, and (d) a dual purpose system will be feasible for both aeration of the grain and recirculation of fumigants.

Summary

THE possibility of adopting grain aeration systems installed in the holds of ships used for storage of surplus wheat, to the recirculation of methyl bromide was studied in four tests at the Hudson River, N. Y. and James River, Va. Reserve Fleets. These tests were followed by ones where a temporary recirculation system using air flow rates comparable

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to those on the ships, was installed in a 135-foot grain elevator tank filled with shelled corn.

Gas samples taken from numerous locations in the grain stored in ships holds, showed that satisfactory distribution resulted when the aeration system as modified into a recirculation system, was operated for 30 to 60 minutes at the start of the fumigation. At the end of the fumigations, the gas was removed from the grain within a few hours by operating the system as for aeration. A natural infestation of several species of stored-grain insects in one hold was wiped out with a dosage rate of 1.8 pounds of methyl bromide per 1000 cubic foot.

The temporary recirculation system installed in a grain elevator tank was comprised of a perforated pipe in the hopper to serve as an air pickup point, a 30-inch blower, a return duct up the outside of the tank to the top, and a damper to regulate the air flow rate. Methyl bromide was distributed in a fairly uniform pattern with air flow rates of 0.0201, 0.0245 and 0.0317 cfm/bushel except for an area next to the walls near the bottom. The area of poor distribution was thought to be due to insufficient air pickup area at the bottom. The gas was readily removed at the end of the fumigation by disconnecting the return duct of the system and operating it as an aeration system.

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GROWTH REGULATORS

(*From Page 45*)

of application from one year to the next to be similar, the comparative stage of development of the fruits may be considered as more important than the number of days after bloom or before harvest. This is not so much a problem with the pre-harvest sprays to prevent drop as it is with thinning sprays. It seems likely that sometime in the future the time of application for a thinning spray will be based on fruit diameter or the condition of the seeds, for example. Until such refinement is made, however, recommendations will continue to be made on the basis of days regardless of the stage of fruit development. This appears to be one variable that investigators quite likely can eliminate more easily than others.

After consideration of the 17 variables discussed above which, independently or through interaction with one another, may affect the results of a growth regulator spray, it is little wonder that many of us concerned in suggesting recommendations for their use by commercial fruit growers are hesitant. Because of all the variable factors involved, it is not possible to conduct an experiment in an orchard one year and repeat it precisely the next year. The situation is analogous to straining apple sauce through a screen mesh in which pulling a single wire will change the size of the particles which pass through it. The results of fruit growers are just as experimental as those of research men and, therefore, all results must be interpreted cautiously. What may

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have worked (or not worked) this year probably will give different results next year.

In a recent conference research workers agreed that the use of growth regulators to thin fruits is a more "ticklish" proposition than their use to prevent pre-harvest drop. Perhaps the best we can hope to accomplish with thinning sprays is to reduce the number of fruits of a heavy crop so that considerably less hand labor is needed to complete the job properly than if a spray had not been used. As to pre-harvest sprays, if a variety ordinarily drops only a few apples then probably it should not be sprayed with a growth regulator. Such a spray, however, may decrease the number of drops caused by the pickers. An important factor in the successful use of pre-harvest sprays involves the time of harvest. Several years ago orchardists usually spot-picked in order to remove those apples which were mature before the bulk of the crop was ready. Now most orchardists spray a growth regulator on their trees to hold all the apples on until it is convenient to harvest the variety in a single picking. As a result, sometimes many of the apples are post-mature and fail to hold up in storage. Actually, orchardists should plan to harvest sprayed trees more carefully than if they were not sprayed. The need for spot-picking often may be accentuated if a growth regulator spray is used.★★

N.Y.S. STATION

(*From Page* 31)

pear, the Gil Peck and Seneca sweet cherries, the Stanley prune, Ontario, Buffalo, and Fredonia grapes, Milton, Taylor, and Newburgh red raspberries, Bristol and Dundee black raspberries, the Sodus purple raspberry, the Catskill strawberry—to mention a few.

The use of chemical defoliants on nursery trees and studies of the effects of nursery practice on subsequent survival and growth of fruit trees are under investigation.

Mineral nutrition of fruit trees is studied in rigidly controlled greenhouse tests and in the orchard. They throw light on the mineral balance involved in absorption of nutrients by apple trees.

Chemical weeding of small fruits, vineyards, and nurseries based on findings at the Experiment Station is now standard practice. Oil-dinitro sprays to control weeds between vines and under the trellis are paying their way, and even more effective and economical control is anticipated with recently developed soil sterilants.

Among chemicals tested by the Station, Crag Herbicide 1 for seedling weeds and selective weed-killers like 2,4-D, Sinox General, and Dow Selective are helping strawberry growers master weeds. 2,4-D and 2,4,5-T are also proving potent brush-killers and aid in eliminating wild plants harboring virus diseases.

Balanced pruning of grapes by adjusting the number of fruit buds to the vigor of the vine and training vines to higher trellises to expose a larger leaf area to sunlight have done much to increase yields and improve quality of Concord grapes. Potash deficiency in New York vineyards has been diagnosed and ways worked out for correcting it. Deficiencies of magnesium, manganese, and iron have also been identified in grapes and control practices studied.

The search continues for good dessert varieties of all hardy fruits, also for greater pest resistance, including scab in apples and fire blight in pears. But increasing attention is being given to sorts which meet specific needs of the processing industry.★★

MEXICO REVIEW

(*From Page* 28)

out the year and increase milk production (9). Various formulations containing chlordane, toxaphene, dieldrin, lindane, methoxychlor and DDT all have proved effective.

An interesting recent report from Mexico (4) states that experiments for control of the Guerro scorpion *Centruroides limpidus limpidus Karsch* have been carried out with

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a number of compounds, with chlordane and isodrin proving most effective.

Herbicides have come into use in Mexico within the past five years. Presently formulations of 2, 4-D are most common and their use has been principally for the control of weeds in summer wheat plantings. Some 70,000 to 100,000 hectares of wheat are treated annually. On a smaller scale, herbicides have been applied for control of weeds in corn, sugar cane and rice, and experiments are in progress on weed control in alfalfa, clover, potatoes and sorghum. Six different compounds are involved in these tests. In view of the importance of weed control and success with herbicides to date, there is little doubt that there is a great future for these chemicals in crop production in Mexico.

Summary

MEXICO is currently in a new phase of its agricultural development. This is caused by the leadership provided by government officials, research scientists, extension agents and agricultural producers, which has now resulted in improved facilities such as roads, rural electrification, better methods and materials and improved farming practices. These have encouraged increased mechanization of agriculture and the expanded use of agricultural chemicals in crop production. Total investment still is small in terms of potential, but it is expected that it will increase steadily during the years to come.

Greatest single benefit from agricultural chemicals will be from the increased use of fertilizers containing nitrogen and phosphorus. Supplementing these will be the chemical protectants externally applied, as well as systemic fungicides, insecticides, and herbicides. Eventually it is expected that the use of agricultural chemicals will be an accepted part of production patterns throughout Mexico with resultant economic benefits.★★

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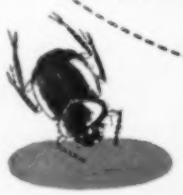

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AMMONIA OUTLOOK

(*Continued from Page 53*)

production of the "forms" of nitrogen which are in demand.

During the February-May 1955 (as in 1954) application season, it is anticipated that the demand for agricultural nitrogen will be greater than can be supplied immediately. (This type of operation requires that production be consumed immediately in direct fertilizer application). Since ammonia plants retain their same capacity to produce even after the application season is over, however, if they are to continue to operate, their product must either have an outlet in other forms of nitrogen, or go to storage.

As recognized throughout the industry, anhydrous is not a substitute in all cases for the solid forms of nitrogen or nitrogen solutions . . . and, as will probably be the case later this year, anhydrous may be in oversupply, while some volume of the solid nitrogen forms may have to be imported to meet domestic requirements.

Nitrogen Short in World Picture

RECOGNIZING the historical role of the U. S. as an importer of nitrogen fertilizers, Clyde Marshall, Commercial Solvents Corp., New York, calls attention to the fact that last year the United States exported a substantial tonnage of nitrogen compounds to Mexico, Cuba, Puerto Rico, Hawaii, Korea, etc. Nitrogen in the world market is in short supply, he points out, which provides a ready outlet for any oversupply in the United States.

Statistics show the United States has steadily increased nitrogen exports to the world market, and consequently is decreasing its imports. In '54-'55, for example, imports totaled 340,000 metric tons as compared with 440,000 tons in each of the previous two years. Similarly, exports increased from 20,000 tons in '51-'52 to about 90,000 tons in 1954-1955.

A look at the European market shows that nitrogen use in Europe is increasing due to a sales program advising greater use of nitrogen on grassland to improve grazing. Demand in most countries is being transferred from ammoniacal to nitric nitrogen products . . . but for the Far East, where rice is the main crop, sulfate of ammonia is still preferred. As a result of their purchases, this form of nitrogen is in short supply in the world market.

This brief look at the world picture shows the need for *nitrogen* products . . . and it must be kept in mind that concern about oversupply is strictly in anhydrous ammonia production . . . and evidently will be a problem primarily for those producers not prepared to convert anhydrous to other forms of nitrogen, or to store for later use.

The problem appears to have been created by production of anhydrous ammonia strictly for sale as such. Mr. Marshall points out that anhydrous ammonia productive capacity has nothing to do with the amount of ammonia used in direct application and that this situation was just as much a problem last year as it is expected to be in 1955. Whereas there has been some indication that anhydrous ammonia was in short supply in 1954, Mr. Marshall stresses that the problem lay not in production but in distribution. He said that in 1954 distribution facilities, including tanks, equipment, etc. were inadequate to bring to the farmer anhydrous ammonia for direct application.

Role of the Distributor

REPRESENTATIVE of the views of the direct applicator were the comments of Dan Curll, President of Chemical Enterprises, Inc., New York. He emphasized that further growth in direct application of ammonia would depend largely on the development of a system which would eliminate difficulties due to heavy seasonal demand. Nitrogen as ammonia or in any other form has to be provided in quantity at the proper season for application by the farmer. If anhydrous ammonia is to be used, there are four ways in which the effects of heavy seasonal demand can be modified. First, producers may convert off-season production into other products but the cost of such conversion and the storage of these other forms of nitrogen may approach in cost that involved in storage of ammonia as such. Second, storage of ammonia may be provided by producers and shipment made to distributing points during the heavy demand season. This also has its limitations due to the heavy burden such movement places on transportation facilities. Third, distributors may provide storage in the field; or fourth, a geographic pattern of distribution may be developed which permits shipments to follow crops requiring application at different periods, thus at least partially relieving the situation.

The long-term increasing demand for ammonia is well recognized but during some periods there will undoubtedly be an over-supply and the seasonal displacements will continue to disturb the industry until marketing policies are established which recognize the cause of the difficulties. The low cost of handling and applying anhydrous ammonia has resulted in farmer demand which undoubtedly will mean that the development of economic distribution methods with sufficient incentive to encourage the investment of the necessary capital will be only a matter of time.

Also reporting that storage and distribution appear to be the main problems of the producer of anhydrous ammonia for direct application, Hugo Riemer, Nitrogen Division, Allied Chemical & Dye Corp., New York, points out that since it is cheaper to build storage tanks than new capacity, it seems reasonable to assume that the anhydrous ammonia producer will look to storage for an answer to the off season surplus, peak season shortage problem.

Mr. Riemer indicated that the ammonia producer with facilities for producing the various nitrogen fertilizers and the nitrogen solutions fertilizer use, and with adequate storage, is unlikely to be overly concerned with a surplus problem this year. Indeed, a shortage is possible in some lines, due to loss of production by the nitrogen industry last summer and fall, due to inadequate storage.★★

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Tale Ends

THE life story of the late Charles MacDowell, one of the builders of the American fertilizer industry, is told in a book, "Two Ears of Corn," just published by Pequot Press. Mr. MacDowell who put Armour & Co. into the commercial fertilizer business and was the first manager of Armour's fertilizer department, spent almost 45 years with the company. He was one of the earliest advocates of high analysis fertilizers and also pioneered the idea of pasture fertilization. Because of the key position he occupied over a long period of years in the development of chemical plant foods in the United States, his biography makes tremendously interesting reading for anyone who shared his experiences in the development of the American fertilizer industry. Mr. MacDowell, who retired from Armour in 1932, was elected as the first Honorary Life Member of the National Fertilizer Association. Of particular interest in this new volume, by Claire Leavitt MacDowell, are the sections dealing with the battle with the German potash cartel in the early 1900's and the early development of the potash industry in the United States. 5¾ x 8½. 242 pages. $5.25. Available through *Agricultural Chemicals*.

AC

It's not often we make the magazine pages ourselves. Mostly we are writing about others. But in the Jan.-Feb. issue of "Better Living" DuPont employee magazine, "Ag Chemicals" is selected to be pictured among representative publications of the business press. DuPont's Bill Lazor is shown tucking what seems to be a copy of the September, 1954 issue of AC into his brief case.

AC

Insecticide packagers look to their labels in advance of the new season. USDA has relaxed a number of restrictions in the light of new evidence. Higher concentrations of some products, notably chlordane, are now permissible, while for a whole series of other products particularly aldrin and dieldrin, milder caution and warning statements are now permissible. Better check up on your own labels.

AC

A 27-minute full color film dealing with use of fertilizers, accenting the humorous aspects of the subject, and designed

to be shown at dealer meetings, in extension work, etc., has just been released by Spencer Chemical Co., Kansas City. Titled "George Tackles The Land," the new film highlights the doings of "Mr. N," a powerful little elf who symbolizes nitrogen. The film does an excellent job of emphasizing the importance of nitrogen, in a very entertaining fashion.

AC

We are gradually getting back to normal in our new headquarters at Caldwell, N. J., though there was a period in early January when things were rather rugged. If we were late in answering correspondence, or you didn't get your issue, accept our apologies. Those were the days when we were living with the painters, the phone men, the movers. The only consolation we had during those paint saturated days was the solemn thought that we won't ever have to move again. Can't, as a matter of fact, for it's our own building and we have to live in it. If you haven't corrected your records, please do. It's Box #31, Caldwell, N. J.

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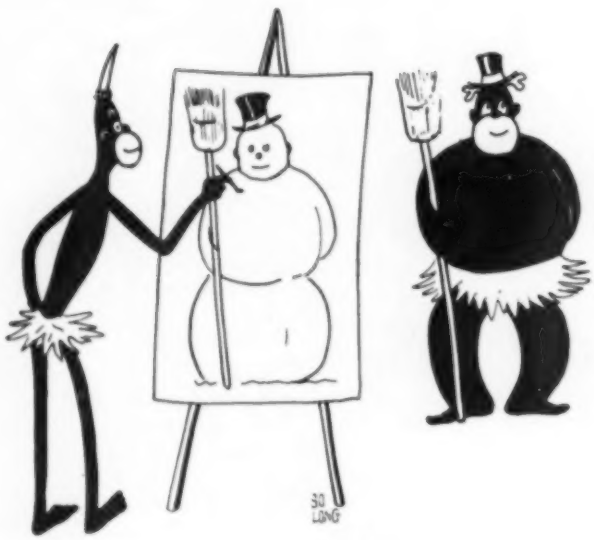

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